OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

MEMORANDUM **January 3, 2018**

TO:	PF Phillip Fielder, P.E., Permits and Engineering Group Manager
THROUGH:	PM Phil Martin, P.E., Engineering Manager, Existing Source Permits Section
THROUGH:	JY Jian Yue, P.E., New Source Permits Section
FROM:	Amalia Talty, P.E., Existing Source Permits Section
SUBJECT:	Evaluation of Permit Application No. **2017-0121-C (PSD)** Tallgrass Terminals, LLC Cushing South Tank Farm Facility ID No.: 17009 N/2 Sections 27, Township 17N, Range 5E, Lincoln County, Oklahoma Latitude 35.92031°N, Longitude 96.75811°W Directions: 4.5 miles south of E Main St. in Cushing, OK on N3500 Rd.

SECTION I. INTRODUCTION

Tallgrass Terminal, LLC. (Tallgrass or the applicant) has submitted an application to construct a new bulk terminal located in Lincoln County, Oklahoma. The new facility is classified under NAICS Code 486110 – Pipeline Transportation of Crude Oil. The proposed tanks will be subject to New Source Performance Standards 40 CFR Part 60 (NSPS), Subpart Kb.

The proposed facility will consist of twenty (20) internal (IFR) and external floating roof (EFR) crude oil storage tanks with a total storage capacity of approximately 5.5 million barrels (bbl). The facility is a listed Prevention of Significant Deterioration (PSD) major source, a crude oil storage facility exceeding 300,000-barrel (bbl) storage capacity with proposed permitted emissions in excess of 100 TPY. Potential VOC emissions have been estimated at 223.17 TPY. Therefore, the application required a full PSD review.

Potential emissions of any single Hazardous Air Pollutant (HAP) are less than 10 TPY, and potential emissions of total HAP are less than 25 TPY. Therefore, the facility will be considered a minor source of HAP emissions.

SECTION II. PROCESS DESCRIPTION

The Cushing South Tank Farm is designed as a crude oil terminal facility. The facility will receive and store crude oil via pipeline and truck receiving operations. The stored liquids are then pumped via pipeline to downstream facilities and customers. The facility will consist of the following equipment.

- Six (6) 500,000 bbl EFR storage tanks [EUG-1]
- Ten (10) 250,000 bbl EFR storage tanks [EUG-1]
- Four (4) 1,000 bbl IFR storage tanks [EUG-2]
- One (1) emergency generator engine [EUG-5]
- Associated piping, metering, and electric pumps [EUG-6]

Oil will be received from trucks and stored in the IFR storage tanks. These tanks will transfer oil to the larger EFR tanks via piping and transfer pumps. The facility input capacity is estimated at 175.2 MM bbl per year via pipeline and 13.9 MM bbl per year from truck receiving operations, which totals an estimated 190 MM bbls per year for the entire facility.

SECTION III. EQUIPMENT

Table 1. Tanks

EU ID#	Contents	Roof Type	Bottom Design	Capacity (bbl)	Height (ft)	Diameter (ft)	Construction Date
T-101	Crude Oil	EFR	Liquid Heel	500,000	48	273	TBD
T-102	Crude Oil	EFR	Liquid Heel	500,000	48	273	TBD
T-103	Crude Oil	EFR	Liquid Heel	500,000	48	273	TBD
T-104	Crude Oil	EFR	Liquid Heel	500,000	48	273	TBD
T-105	Crude Oil	EFR	Liquid Heel	500,000	48	273	TBD
T-106	Crude Oil	EFR	Liquid Heel	500,000	48	273	TBD
T-107	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-108	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-109	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-110	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-111	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-112	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-113	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-114	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-115	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-116	Crude Oil	EFR	Liquid Heel	250,000	48	194	TBD
T-117	Crude Oil	IFR	Liquid Heel	1,000	30	15.5	TBD
T-118	Crude Oil	IFR	Liquid Heel	1,000	30	15.5	TBD
T-119	Crude Oil	IFR	Liquid Heel	1,000	30	15.5	TBD
T-120	Crude Oil	IFR	Liquid Heel	1,000	30	15.5	TBD

TBD – To be determined.

SECTION IV. EMISSIONS

Emission units have been arranged into Emission Unit Groups (EUGs) as follows:

A. EUG 1 & EUG 2: NSPS Subpart Kb Tanks

VOC emissions from the Kb tanks were estimated using the calculation methodology outlined in AP 42, Fifth Edition Compilation of Air Pollutant Emission Factors; Ch. 7.1 – Organic Liquid Storage Tanks (AP 42, Ch. 7.1). The emission calculation programs TanksESP_d and EPA's TANK 4.09d were used to estimate emissions. The estimates assume the contents to be crude oil with a Reid vapor pressure (RVP) of 9 and the throughputs listed in the following table. Throughput for the EFR tanks [EUG 1] are based on a maximum facility input capacity of 20,000 bbl/hr. Throughput for the truck receiving IFR tanks [EUG 2] is based on 38,000 bbl/day or an estimate of 200 trucks/day.

Table 2. Kb Tank Emissions (Normal Operations)

EUG	EU ID#	Throughput (bbl/yr)	Standing Losses (lb/yr)	Withdrawal Losses (lb/yr)	Total Emissions (TPY)
1	T-101	16,000,000	8,301.90	2,354.39	5.33
	T-102	16,000,000	8,301.90	2,354.39	5.33
	T-103	16,000,000	8,301.90	2,354.39	5.33
	T-104	16,000,000	8,301.90	2,354.39	5.33
	T-105	16,000,000	8,301.90	2,354.39	5.33
	T-106	16,000,000	8,301.90	2,354.39	5.33
	T-107	7,920,000	6,103.07	1,640.00	3.87
	T-108	7,920,000	6,103.07	1,640.00	3.87
	T-109	7,920,000	6,103.07	1,640.00	3.87
	T-110	7,920,000	6,103.07	1,640.00	3.87
	T-111	7,920,000	6,103.07	1,640.00	3.87
	T-112	7,920,000	6,103.07	1,640.00	3.87
	T-113	7,920,000	6,103.07	1,640.00	3.87
	T-114	7,920,000	6,103.07	1,640.00	3.87
	T-115	7,920,000	6,103.07	1,640.00	3.87
	T-116	7,920,000	6,103.07	1,640.00	3.87
2	T-117	3,467,500	798.08	8,986.82	4.89
	T-118	3,467,500	798.08	8,986.82	4.89
	T-119	3,467,500	798.08	8,986.82	4.89
	T-120	3,467,500	798.08	8,986.82	4.89
		TOTAL	**114,034.42**	**66.473.62**	**90.24**

B. EUG 3: Roof Landings

The twenty (20) tanks are flat bottom floating roof tanks. During normal operation, a floating roof is in contact with the liquid inside the tank, reducing evaporative losses. However, when the tank is emptied to the point that the roof lands on its deck legs, a vapor space is created. After the roof is landed, evaporative losses occur during idle standing and subsequent filling.

VOC emissions from roof landings were calculated using AP-42 (11/06), Section 7.1. Emissions are estimated by assuming the following number of landings per tank type per year: two (2) per 1,000-bbl IFR tanks, five (5) per 250,000-bbl EFR tanks, and three (3) per 500,000 bbl EFR tanks.

In Equation 2-10, roof landing emissions are the sum of standing idle losses and filling losses during each roof landing episode. Standing idle losses for each roof-landing event were calculated based on Equation 2-19 for EFR tanks and Equation 2-16 for the IFR tanks. Filling losses were calculated for each roof-landing event based on Equation 2-26 for the EFR tanks.

The following table summarizes the estimated roof landing losses for each roof landing event for each tank type.

Table 3. Roof Landing Emissions

EU ID#	Type	Landing Turnovers (per tank per yr)	Losses (lb/event)	Losses (lb/yr)	Total (tons/yr)
L-1a	500,000-bbl EFR Tanks	3	12,817.3	38,452	19.2
L-1b	250,000-bbl EFR Tanks	5	6,577.4	32,887	16.4
L-1c	1,000-bbl IFR Tanks	2	41.7	83	0.04
			TOTAL	71,423	35.7

C. EUG 4: Tank Cleanings

Each tank is periodically cleaned, requiring liquid evacuation and vapor purging. Emissions occur during an initial purge, potential subsequent daily purges, and sludge removal. Tank cleaning VOC emissions were calculated based on the American Petroleum Institute's (API) Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks" (November 2007). There is estimated to be one (1) 500,000-bbl, two (2) 250,000-bbl and one (1) 1,000 bbl tank cleaning per year to meet inspection and maintenance requirements under NSPS Subpart Kb and API standards. Landing and cleaning events are assumed to occur in the month with the highest average monthly temperature (July) for purposes of calculating PTE.

Per Equation 4, total tank cleaning emissions are the sum of standing idle losses, vapor purge losses, sludge removal losses, and refilling losses per cleaning. Standing idle losses for each cleaning events were calculated based on AP-42 (11/06), Section 7.1 Equation 2-19 for EFR tanks and Equation 2-16 for the IFR tanks. Vapor purge losses were calculated based on AP-42 (11/06), Section 7.1 Equation 2-26. Sludge removal losses were calculated based on API TR 2568 (11/07) Equation 19. Refilling losses were calculated based on API TR 2568 (11/07) Equation 23. When the tank is cleaned, filling losses are assumed to be similar to Drain-Dry tanks with a floating roof.

The following table summarizes the estimated tank cleaning losses for each cleaning event for each tank type. All tanks of a type will share the cleaning turnovers amount per year.

Table 4. Tank Cleaning Emissions

EU ID#	Type	Cleaning Turnovers (per tank type per year)	Losses (lb/event)	Losses (lb/yr)	Total (tons/yr)
C-1a	500,000-bbl EFR Tanks	1	92,286	92,286	46.1
C-1b	250,000-bbl EFR Tanks	2	47,109	94,218	47.1
C-1c	1,000-bbl IFR Tanks	1	2,811	2,811	1.4
			TOTAL	**189,316**	**94.7**

D. EUG 5: Emergency-Use Engines

Emergency-use diesel engine emissions are based on an assumed runtime of 500 hours per year. Emission factors are derived from EPA's Tier 3 standards (NSPS Subpart IIII, Table 4), and are listed in the table below.

Table 5. NSPS Subpart IIII Emission Standards

EU #	Model year	NO_X (g/hp-hr)	CO (g/hp-hr)	VOC (g/hp-hr)	PM (g/hp-hr)
GEN-1	2015	3.0	2.6	1.0	0.15

Table 6. Emergency Use Engines

Unit ID	Rating (HP)	NO_X (TPY)	CO (TPY)	VOC (TPY)	PM (TPY)
GEN-1	450	0.74	0.64	0.25	0.04

E. EUG 6: Fugitive Equipment Leaks

Fugitive VOC emissions from piping components were calculated using emission factors for light oil service at petroleum marketing terminals in EPA's "Protocol for Equipment Leak Emission Estimates" (EPA-453/R-95-017) and an estimated number of components.

Table 7. Fugitive Emissions

Service	Component	Component Count	Emission Factor (lb/hr/comp)	Emissions (lb/hr)	Emissions (TPY)
Light Liquid	Connectors	3,500	0.0000176	0.062	0.27
	Flanges	800	0.0000176	0.014	0.06
	Pumps	80	0.00119	0.095	0.42
	Valves	1,800	0.0000948	0.171	0.75
	Other	200	0.000287	0.057	0.25
Gas Vapor	Connectors	100	0.0000926	0.009	0.04
	Valves	75	0.0000287	0.002	0.01
			Total	**0.41**	**1.80**

F. Trivial Activities

In addition to the equipment/operations in the EUG's listed above, the facility also includes pigging equipment and one (1) 4,000-gallon underground horizontal sump tank, which are included for PSD purposes. VOC is emitted from the pig traps after each pigging event. VOC emissions from the pig traps were estimated from AP-42 (11/06), Section 7.1 for clingage losses. Residual crude oil on the entire inner surface area of the aboveground segment of the pig trap is assumed to evaporate. Evaporative losses for each pigging event were calculated based on Equation 2-22, as follows:

$$L_C = 0.042 C_S W_l (Area)$$

Where:

L_C	=	clingage loss from each event, lb,
0.042	=	conversion factor, gal/bbl,
C_S	=	clingage factor, 0.006 bbl/1,000 ft^2 (from AP-42 (11/06) Table 7.1-10),
W_l	=	density of the liquid, 7.1 lb/gal, and
$Area$	=	Surface area of the pipe, 126 ft^2 (based on a 20 ft pipe with 2 ft diameter).

Based on the above methodology, emissions from each pigging event were calculated to be 0.22 pounds per event. Based on the assumption that 48 events will occur each year, total VOC emissions from pigging events were calculated to be 0.01 TPY.

VOC emissions from the underground sump tank were estimated using EPA's TANK 4.0.9d program, assuming the contents to be crude oil with a Reid vapor pressure (RVP) of 9 and the throughputs listed in the following table.

Table 8. Sump Tank Emissions

EU ID#	Throughput (bbl/yr)	Standing Losses[1] (TPY)	Working Losses (TPY)	Total Emissions (TPY)
S-1	208,000	---	0.49	0.49

[1] There are no standing losses associated with underground storage tanks.

G. Facility-Wide Emissions

Table 9. Facility-Wide Emissions

EUG	Description	NO_x (TPY)	CO (TPY)	VOC (TPY)
1	Six (6) 500,000-bbl EFR Tanks	--	--	32.0
	Ten (10) 250,000-bbl EFR Tanks	--	--	38.7
2	Four (4) 1,000-bbl IFR Tanks	--	--	19.6
3	Tank Landings	--	--	35.7
4	Tank Cleanings	--	--	94.7
5	Emergency Use Engines	0.74	0.64	0.25

Table 9. Facility-Wide Emissions

EUG	Description	NO_x (TPY)	CO (TPY)	VOC (TPY)
6	Fugitive Emissions	--	--	1.80
--	Trivial Activities	--	--	0.50
	TOTAL	**0.74**	**0.64**	**223.17**

H. Greenhouse Gas (GHG) Emissions

GHG emissions for the crude oil are based on the weight percentage of Carbon Dioxide and Methane from the extended analysis for the Bakken Light Sweet Crude sample taken at a Tallgrass facility on May 28, 2016. Weight % for CO_2 is 0.003 and Methane is 0.068 with 100% emitted. GHG emissions for EGEN1 were calculated using CFR Part 98, Subpart C factors. CO_{2e} was calculated using a GWP of 25 for methane and 298 for Nitrous Oxide.

Table 10: GHG Emissions

	CO_2	Methane	Nitrous Oxide (N_2O)	CO_{2e}
TPY*	125.91	0.16	0.001	129.46

* includes both TANKS and EGEN1

I. HAP Emissions

HAP emissions were calculated using the HAP weight percentage from the extended analysis for the Niobara Crude, conservatively assuming 100% emitted from each source based on the total VOC estimated from that unit. Emission factors taken from AP-42 (10/96), Section 3.3-2 were used for EGEN1.

Table 11. HAP Emissions

HAP	Speciation Profile (wt%)	Emissions	
		lb/hr	TPY
Benzene	0.23	0.12	0.52
Toluene	0.63	0.32	1.41
Ethylbenzene	0.17	0.08	0.37
Xylene	0.51	0.26	1.13
n-Hexane	1.60	0.81	3.57
2,2,4-TMP	0.62	0.31	1.37
	Total	**1.91**	**8.38**

J. Hydrogen Sulfide (H_2S) Emissions

Emissions of H_2S were estimated using a mass emission ratio based on the methodologies provided in "Using K factors to Estimate Quantities of Individual Vapor Species Emitted during the Storage and Transfer of Hydrocarbon Liquids" by Jeffery L. Meling, et al. and the information presented in the following table.

Table 12. Crude Oil Parameters

Parameter	Value
H_2S Concentration[1] (ppmw)	135
H_2S Molecular Weight (lb/lb-mol)	34.1
Vapor Molecular Weight (lb/lb-mol)	50.0
Liquid Molecular Weight (lb/lb-mol)	207.0
True Vapor Pressure (psia)	10
K Factor[2]	19

1 – H_2S ppmw based on concentration typically found in crude oils with 5 wt% sulfur content.
2 – K factor obtained from the nomograph for H_2S in crude oil and an ambient temperature of 60°F.

Emission estimates for H_2S are provided in the following table

Table 13. H_2S Emissions

Emissions Source	lb/24-hr	ppmv	lb/hr
EFR Standing Losses	484.7	15,610[1]	3.15E-01
EFR Working Losses	83.4	135[2]	4.69E-04
Total EFR Emissions		--	0.316
IFR Standing Losses	15.5	15,610[1]	1.01E-02
IFR Working Losses	98.2	135[2]	5.52E-04
Total IFR Emissions		--	0.011

1 – Involves evaporation from standing liquid utilizing the weight fraction of H_2S in the crude vapor (calculated using K factors).
2 – Involves complete evaporation of the liquid layer utilizing the weight fraction of H_2S in the crude liquid.

SECTION V. PSD REVIEW

The project is subject to PSD review because it is a listed PSD-major source, a crude oil storage facility exceeding 300,000-barrel (bbl) storage capacity with proposed permitted emissions in excess of 100 TPY. The pollutants subject to PSD review are listed in the following table. Since VOC triggered PSD, the threshold for all other pollutants is the PSD significant emission rate (SER) for a major source modification.

Table 14. PSD Applicability

Pollutant	Project Emissions (TPY)	PSD Threshold (TPY)	Subject to PSD?
NO_X	<1.0	40	No
CO	<1.0	100	No
VOC	223.17	100	**Yes**
PM_{10}	<1.0	15	No
$PM_{2.5}$	<1.0	10	No
SO_2	<1.0	40	No
H_2S	<1.0	10	No

The full PSD review consists of the following:

A. Determination of Best Available Control Technology (BACT);
B. Evaluation of existing air quality and determination of monitoring requirements;
C. Air Quality Impact Analysis
D. Evaluation of source-related impacts on growth, soils, vegetation, and visibility; and
E. Evaluation of Class I area impacts.

A. Best Available Control Technology (BACT)

Any major stationary source or major modification subject to PSD review must undergo an analysis to ensure the use of best available control technology (BACT). The requirement to conduct a BACT analysis is set forth in 40 CFR 52.21. BACT is defined in 40 CFR 52.21 as:

"...best available control technology means an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant..."

A BACT analysis is required for each new or physically modified emission unit for each pollutant that exceeds an applicable PSD significant emission rate (SER). Since the VOC emissions from the proposed project exceed the applicable PSD SER, a BACT analysis is required to assess the necessary levels of control for this pollutant.

The following methodology for performing a top-down BACT analysis has been developed from the US EPA's 1990 Draft New Source Review Workshop Manual - BACT Guidance. The analysis utilizes five key steps to identify the most suited BACT option for the project. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically, environmentally, or economically infeasible for the unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

Step 1: Identify Available Control Technologies

Available control technologies are identified for each emission unit in question. The following methods are used to identify potential technologies: 1) researching the Reasonably Available Control Technology (RACT)/BACT/Lowest Achievable Emission Rate (LAER) Clearinghouse (RBLC) database, 2) surveying regulatory agencies, 3) drawing from previous engineering experience, 4) surveying air pollution control equipment vendors, and 5) surveying available literature.

Step 2: Eliminate Technically Infeasible Options

After the identification of control options, an analysis is conducted to eliminate technically infeasible options. A control option is eliminated from consideration if there are process-specific conditions that prohibit the implementation of the control technology or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits, such as an NSPS.

Step 3: Rank Remaining Control Options by Control Effectiveness

Once technically infeasible options are removed from consideration, the remaining options are ranked based on their control effectiveness. If there is only one remaining option, or all of the remaining technologies could achieve equivalent control efficiencies, ranking based on control efficiency is not required.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

Beginning with the most efficient control option in the ranking, detailed economic, energy, and environmental impact evaluations are performed. If a control option is determined to be economically feasible without adverse energy or environmental impacts, it is not necessary to evaluate the remaining options with lower control efficiencies.

The economic evaluation centers on the cost effectiveness of the control option. Costs of installing and operating control technologies are estimated following the methodologies outlined in the EPA's OAQPS Control Cost Manual (CCM)[1] and other industry resources. Cost effectiveness is expressed as dollars per ton of pollutant controlled. Objective analyses of energy and environmental impacts associated with each option are also conducted. Both beneficial and adverse impacts are discussed and quantified.

[1] *EPA Air Pollution Control Cost Manual, Sixth Edition, January 2002 [EPA/452/B-02-001]*

Step 5: Select BACT and Document the Selection as BACT

In the final step, one pollutant specific control option is proposed as BACT for each emission unit under review based on evaluations from the previous step. The resulting BACT standard is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emissions standard infeasible, in which case a work practice standard can be imposed.

BACT Analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses)

Step 1: Identify Available Control Technologies

Several different control options have been selected for BACT top-down analysis for control of emissions from normal tank operations (standing and withdrawal losses). The following table lists commercially available controls for petroleum liquid storage. The control technologies are listed in order of decreasing emission reduction potential.

Table 15. Control Technologies for Normal Operations

Control Technologies
Routing Vapor Space to a Control Device • Thermal Incinerator • Flare • Vapor Combustor • Refrigerated Condenser • Carbon Adsorption Roof Selection • EFRs, IFRs • Fixed Roof Seal Selection • Double Seal • Liquid, Mechanical Shoe • Wiper Submerged Fill Good Operating and Maintenance Practices

Routing Vapor Space to a Control Device

Evaporative losses from tanks can be routed to a variety of control devices with varying destruction efficiencies. Combustion type controls, including flares, combustors, and incinerators, destroy VOCs with auxiliary fuel injection. Destruction efficiencies range from 98-99.9%, depending on the material. Adsorption technologies, which physically filter VOC, have capture efficiencies that range from 50-90%, depending on the material. Condensation techniques can achieve removal efficiencies above 90% relative to VOC composition and concentration in the emission stream. Refrigerated condensers are used as air pollution control devices for treating emissions streams with high VOC concentrations for sources such as gasoline bulk terminals. Pressure/vacuum conservation vents reduce evaporation of tank contents when vapor space is increased or decreased due to liquids being pumped in or out of the tank. These vents are typically mounted to a flange or pipe that connects to the vapor space above the liquid level in the tank.

Roof Selection
Three basic roof types are considered: external floating roof (EFR), internal floating roof (IFR), and fixed roof.

Fixed roof tanks – These tanks consist of a cylindrical steel shell with a permanently fixed roof that can be either cone-shaped, dome-shaped, or flat. Evaporative losses occur in these tanks through vapor expansion and contraction and from working losses as filling vapors are expelled from the tank. NSPS Subpart Kb requires a floating roof for Tallgrass's tanks, i.e. the tanks must be IFR or EFR. Therefore, fixed roof tanks are not considered further in this analysis. The baseline option for this facility is constructing EFR storage tanks and IFR tanks for receiving trucking operations.

Internal floating roof tanks (IFRs) – These tanks consist of an open cylindrical steel shell with a roof, or deck, which floats on the surface of the stored liquid. The roof height changes with the liquid level of the material stored within the tank, effectively minimizing vapor space. A rim seal system is attached to the deck's perimeter and makes contact with the tank wall. These two systems combine to reduce VOC emissions from the stored material. Losses from these tanks originate from exposed liquid at the rim seal system and deck fittings. The fixed roof serves as a vapor barrier and blocks air movement. Additionally, the internal floating roof tank deck is lighter than those used in external roof tanks. Losses from these tanks are the same as EFRs, with the exception that emissions induced by air movement are reduced. This option is estimated to provide a control efficiency of roughly 40%[2]. Actual reduction will vary depending on tank fittings. In addition to the basic tank configuration, there is an add-on option to further reduce emissions and is listed as follows:

- IFR with Vapor Space Routed to a Control Device – This option would involve installing a dedicated vapor collection system to route emissions from each tank to a dedicated control device as listed in the previous control technology category (routing vapor space to a control device). This option is estimated to provide a control efficiency of 99%[3].

External floating roof tanks (EFRs) – These tanks are similar to IFR tanks with the exception that they do not have a fixed roof, and the floating roof is heavier than those used in IFR tanks. In addition to the basic EFR tank configuration, there are several add-on options that can further reduce emissions.

- Cone Roof Add-on Only – This option involves installing a fixed coned roof over the top of each tank at the terminal, thereby creating IFR tanks from the previous EFR tanks. The coned exterior roofs would be supported by columns that penetrate through the floating roof inside each tank. The fixed coned roof design acts to control emissions as listed in the previous control technology (IFR).

[2] *Reduction above baseline (EFR emissions) based on TANKS 4.0.9d estimates.*
[3] *Reduction above baseline (EFR emissions) based on typical thermal oxidizer control efficiency.*

- Cone Roof Add-on with Vapor Space Routed to a Control Device - This option is the same as the IFR control option listed above (IFR with Vapor Space Routed to a Control Device).

- Domed External Floating Roof – This option involves constructing a self-supporting geodesic dome over the existing external floating roof on each tank at the terminal. Similar to the cone roof add-on option, geodesic domes are utilized to minimize the wind over the top of the external floating roof. The domed tanks are generally vented with circulation vents at the top of each roof. Emissions from each domed EFR tank would not be piped to a control device. Since the geodesic domes would be self-supporting, the installation of column supports penetrating through the floating roof would not be necessary and gaps in the floating roof would be minimized. This design is still referred to as an external floating roof because it utilizes the existing heavier-duty, double-sealed fully intact EFR, though for emission estimation purposes it is treated as an IFR with no support columns. This option is estimated to provide a control efficiency of up to 70%[4]. Actual reduction can be vary depending on tank fittings.

Seal Selection

Rim seals are used in floating roof tanks, and allow the roof to rise and fall with the level of the liquid in the tank. Seals minimize the annular space between the tank wall and rim, reducing emissions. A rim seal can consist of a single primary seal or also be paired with a secondary seal, which is mounted above the primary seal (double seal).

Mechanical shoe seals use a light-gauge metallic band as the contact with the tank shell. This seal consists of a series of sheets, or shoes, joined in a ring. The sheets are held against the tank shell mechanically. The shoes' bottoms extend below the liquid surface and confine the vapor space between the shoe and floating roof. Primary seal fabric extends from the shoe to the rim and seals the vapor space from the atmosphere.

Resilient filled seals either eliminate the vapor space between the rim seal and liquid surface (liquid mounted) or allow vapor space between the rim seal and liquid surface (vapor mounted). These seals are made of an open-cell foam covered in a coated fabric and attach to the deck's perimeter. Filled seals expand and contract while maintaining contact with the tank wall and accommodate variable annular rim space widths. These seals give room for the floating roof to move with the material surface without binding. To effectively reduce emissions, seal joints must be vapor tight, and the seal must be in contact with the tank wall.

Wiper seals consist of a continuous annular blade made of flexible material which is fixed to a mounting bracket on the floating roof perimeter. This blade spans the annular rim space and contacts the tank wall. These seals are vapor mounted, and a vapor space exists between the liquid surface and the seal. The blades are either made of a cellular, elastomeric material, or a foam core wrapped in fabric. To effectively reduce emissions, the mounting must be vapor tight, and the seal must extend around the deck while maintaining contact with the tank wall.

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[4] *Reduction above baseline (EFR emissions based on TANKS 4.0.9d estimates.*

In a double seal configuration, secondary seals are either resilient filled or flexible wiper seals, which can further reduce evaporative loss. Secondary seals can be either shoe or rim mounted; although rim mounted seals are more effective due to coverage of the entire rim vapor space.

Submerged Fill

Submerged loading can be accomplished using the bottom loading method. A bottom-loading fill pipe is permanently attached to the bottom of the tank, significantly controlling liquid turbulence. Subsequently, much lower vapor generation occurs than during splash loading, where the tank is filled from the top of the tank.

Good Operating and Maintenance Practices

Good operating and maintenance practices for normal operations include, but are not limited to, white paint color, routine inspections, and timely repairs.

Step 2: Eliminate Technically Infeasible Options

All control options are technically feasible when considered individually. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

Floating roof tanks reduce vapor space emissions more effectively than fixed roof tanks because the deck rests atop the liquid surface and reduces the vapor space within the tank.

Liquid-mounted seals provide better emission control than mechanical-shoe and vapor mounted seals, but do not greatly out-perform mechanical-shoe seals. The maintenance and reliability of mechanical-shoe seals may be advantageous as compared to liquid-mounted seals. Add-on control options add additional emission control beyond the basic required components of each tank.

Table 16: Control Technology Options for Storage Tanks

Option	Description
Baseline : EFR and IFR	EFR storage tanks with mechanical shoe seal and second rim-mounted wiper seal
	IFR storage tanks for receiving trucking operations
	Additionally, all tanks will be designed to have submerged fill loading and will be operated and maintained in accordance with NSPS Subpart Kb
Option 1 : EFR with cone roof add-on	All EFR tanks equipped to reduce emissions with cone roof add-on
Option 2: Option 1 with Vapor Collection	All EFR tanks equipped to reduce emissions with cone roof add-on, and closed vent vapor collection system routing vapors to a control device (including as-built IFR tanks)
Option 3: Geodesic Dome EFR	EFR Storage tanks built with a self-supporting geodesic dome
	IFR Storage tanks for receiving trucking operations

Table 17. Rank of Control Technologies for Normal Operations

Rank	Option
1	Option 2: EFR w/ cone roof add-on and vapor collection
2	Option 3: Geodesic dome EFR
3	Option 1: EFR w/ cone roof add-on
4	Baseline: EFR and IFR

In addition to control effectiveness and emissions considerations, each BACT option must also be evaluated for economic impacts, environmental, and energy impacts. These considerations are further discussed in Step 4.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

All tanks will be built to operate with submerged fill piping and will have good operating and maintenance practices in accordance with NSPS Subpart Kb. NSPS Subpart Kb requires an EFR and IFR for tanks of this size storing petroleum with a true vapor pressure less than 11.1 psia. Therefore, the baseline option for this facility is constructing EFR storage tanks and IFR storage tanks for receiving trucking operations.

The economic consideration for each remaining BACT option is based on an itemized cost analysis. Expenses associated with the control options include tank construction, incinerator equipment, and annual operating costs. In Table 18, the cost for an EFR tank is represented as the baseline cost, and the remaining BACT options are estimated as the incremental or increased cost of emission control over the baseline. BACT cost is the incremental expenses in dollars per ton of VOC reduced. The expense is the annual control cost, which includes annualized capital costs (i.e. tank construction, destruction equipment, etc.) and annual operating costs (i.e. maintenance and pilot gas). The tons of VOC reduced are conservativly estimated as the control efficiency multiplied by the baseline emission rate assuming 100% capture for destruction controls. Baseline emissions are based on the EFR tank emissions with no additional control. For Option 2: IFR with vapor collection, the baseline emissions from IFR tanks were conservatively included since this option would also result in a reduction of IFR tank emissions for receiving trucking operations.

Table 18. Initial Costs (EFR Storage Tanks – Normal Operations)

Proposed Tanks		Baseline: EFR and IFR		Option 1: IFR	
Capacity	**Qty.**	**Cost/Tank**	**Total Cost**	**Cost/Tank**	**Total Cost**
250,000	10	3,481,000	34,810,000	3,686,000	36,860,000
500,000	6	6,962,000	41,772,000	7,372,000	44,232,000
Total	16	--	**$76,582,000**	--	**$81,092,000**

Table 18. (cont.)

Proposed Tanks		Option 2: IFR with Vapor Collection		Option 3: Geodesic Dome	
Capacity	**Qty.**	**Cost/Tank**	**Total Cost**	**Cost/Tank**	**Total Cost**
250,000	10	3,686,000	36,860,000	3,852,000	38,520,000
500,000	6	7,372,000	44,232,000	7,704,000	46,224,000
Total	**16**	--	**$81,092,000**	---	**$84,744,000**

Table 19. Unit Cost Analysis for Option 2 (Normal Operations)

Capacity (bbl)	**250,000**	**500,000**
Tank Roofs	205,000	410,000
Thermal Oxidizer	218,200	230,600
Piping to TO	33,200	33,200
Direct Costs		
Total Capital Investment	456,400	673,800
Total Annual Cost	54,800	57,100
Interest	6%	6%
Equipment Life (yrs)	15	15
Total Annual Cost	$101,792	$126,476
Emission Reductions		
Baseline Emission (TPY)	3.9	5.3
Control Efficiency	99%	99%
Emissions Reduced (TPY)	3.8	5.3
BACT Cost ($/ton)	**26,558**	**23,977**

[1] IFR installation costs are based on vendor quote from Matrix PDM for complete tanks -- actual costs for retrofitting cone and dome roofs onto EFR tanks are typically higher
[2] Thermal oxidizer and associated vapor collection piping installation costs are based on EPA Control Cost Manual
[3] Annual operation costs associated with the thermal oxidizer are based on EPA Control Cost Manual
[4] Control efficiency based on EPA Control Cost Manual typical thermal oxidizer control efficiency

Table 20: Unit Cost Analysis for Option 3

Capacity (bbl)	250,000	500,000
Tank Roofs	205,000	410,000
Direct Costs		
Total Capital Investment	205,000	410,000
Total Annual Cost	0	0
Interest	6%	6%
Equipment Life (yrs)	15	15
Total Annual Cost	$21,107	$42,215
Emission Reductions		
Baseline Emission (TPY)	3.9	5.3
Control Efficiency	40%	40%
Emissions Reduced (TPY)	1.5	2.1
BACT Cost ($/ton)	**13,630**	**19,807**

[1] IFR installation costs are based on vendor quote from Matrix PDM for complete tanks -- actual costs for retrofitting cone and dome roofs onto EFR tanks are typically higher

[2] Control efficiency is based on TANKS 4.0.9d estimates

Table 21: Unit Cost Analysis for Option 1

Capacity (bbl)	250,000	500,000
Tank Roofs	371,000	742,000
Direct Costs		
Total Capital Investment	371,000	742,000
Total Annual Cost	0	0
Interest	6%	6%
Equipment Life (yrs)	15	15
Total Annual Cost	$38,199	$76,398
Emission Reductions		
Baseline Emission (TPY)	3.9	5.3
Control Efficiency	70%	70%
Emissions Reduced (TPY)	2.7	3.7
BACT Cost ($/ton)	**14,095**	**20,484**

[1] Geodesic Dome EFR installation costs are based on vendor quote from Matrix PDM for complete tanks -- actual costs for retrofitting cone and dome roofs onto EFR tanks are typically higher

[2] Control efficiency is based on TANKS 4.0.9d estimates

From the tables on the previous page, the reduction in emissions ranges from 1.5 to 5.3 TPY. For the lowest economic impact, the lowest available cost per ton reduced is approximately $13,630. This value represents an infeasible economic impact. Due to the extremely high and unreasonable economic impact for each of these BACT options, they are inappropriate BACT alternatives beyond the baseline NSPS Subpart Kb standards and Baseline: EFR and IFR option.

Since Option 2: IFR with vapor collection could be installed on the as-built IFR tanks without the expense associated with the EFR cone roof add-on, this option was analyzed for the IFR tanks.

Table 22: Unit Cost Analysis for IFR Storage Tanks (Option 2) – Normal Operations

Capacity (bbl)	1,000
Purchased Equipment Costs	
Thermal Oxidizer	$227,200
Piping to TO	$33,200
Direct Costs	
Total Capital Investment	$260,400
Total Annual Costs	$56,400
Interest	6%
Equipment Life (yrs)	15
Total Annual Costs	$83,212
Emission Reductions	
Baseline Emissions (TPY)	4.9
Control Efficiency	99%
Emissions Reduced	4.8
BACT Cost ($/tons reduced)	**$17,182**

[1] Costs and control efficiency for the thermal oxidizer and vapor collection piping installation is based on EPA Air Pollution Control Costs Manual (Jan 2002)

From the tables above, the reduction in emissions for an IFR tank with vapor collection is 4.8 TPY. This would incur a cost per ton reduced of approximately $17,182. This value represents an infeasible economic impact. Due to the extremely high and unreasonable economic impact for each of these BACT options, they are inappropriate BACT alternatives beyond the baseline NSPS Subpart Kb standards and Baseline: EFR and IFR option.

Environmental and energy impacts from the Option 2: IFR with Vapor Collection are as follows: increase in NOx emissions, increase in CO emissions, noise, and fuel consumption. The other control options evaluated have no considerable environmental or energy impacts. However, since the economic impacts for each of the options are unreasonably high, these impacts were not further considered.

Step 5: Select BACT and Document the Selection as BACT

Tallgrass has proposed to implement the following design elements and work practices:

- External floating roof compliant with NSPS Subpart Kb standards,
- Good operation and maintenance practices as set forth by NSPS Subpart Kb.

As mentioned previously, the resulting BACT standard is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emissions standard infeasible, in which case a work practice or operating standard can be imposed. For the proposed storage tanks, Tallgrass proposes a VOC BACT emission limit of 5.33 tons of VOC per year for each 500K-bbl tank, 3.89 tons of VOC per year for each 250K-bbl tank, and 4.89 tons of VOC per year for each 1,000-bbl tank, based on a 12-month rolling average basis.

DEQ evaluated the BACT proposal from Tallgrass and agrees that their design elements, emission limits, and work practices are selected as BACT. The chosen level of BACT is consistent with findings from EPA's RBLC for similar conditions and operations. The clearinghouse listed several facilities (e.g. RBLC IDs OK-0139, LA-0286, and TX-0653) with crude oil storage tanks. Acceptable PSD BACT controls for these facilities were external floating roofs equipped with primary mechanical shoe and secondary seals (double seals). Additionally, no other Cushing major source terminals employ controls above NSPS Subpart Kb. Recent analysis of similar sources has shown consolidating control devise does not result in significant cost savings.

BACT Analysis for Storage Tanks – Landings

Step 1: Identify Available Control Technologies

The following table lists commercially available controls for landings and cleanings in order of decreasing emission reduction potential. Control technologies for each pollutant were considered in order of decreasing emission reduction potential.

Table 23. Control Technologies for Landings

Control Technologies
Routing Vapor Space to a Control Device • Thermal Incinerator • Flare • Vapor Combustor • Refrigerated Condenser • Carbon Adsorption Mobile Degassing • Thermal Oxidizer • Carbon Adsorption Drain-Dry Design Submerged Fill Good Operating and Maintenance Practices

Routing Vapor Space to a Control Device
In addition to the discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses), over the top fixed vapor collection is another option that involves installing a fixed (or permanent) vapor collection line going over the top of the side wall of each EFR tank at the terminal. The line would go through the existing external floating roof to collect emissions from the vapor space formed underneath the floating roof as it lands. The use of this option would only be good during landing events when a vapor space is created. During other times, the tank would be filled with liquid and the line would be submerged underneath the floating roof. Vapors that are collected would be piped to a common control device at the site. A thermal oxidizer would be the chosen control device to control volatile emissions from tanks at the site. The implementation and operation of this effort would be led by site personnel. In addition to the operation and maintenance of the vapor collection device that runs over the top of each tank, operators at the site would also be responsible for the maintenance and operation of the thermal oxidizer.

Mobile Degassing
Mobile degassing units are an alternative to running a fixed line to each tank. The units are portable and can be utilized during individual emissions events. The vapors generated during activities such as tank landings would be evacuated out of the vapor space in the tank and collected by the units. The gases collected are treated by a control device (e.g., carbon adsorber or thermal oxidizer). Efficiencies in excess of 95% are estimated by vendors.

Drain-Dry Design
Drain-dry design is the construction of the tank bottom with a slope which drains the liquid contents to the sump or sumps when liquid levels fall below the pipe outlet. The amount of remaining liquid is minimized during tank draining. Design may be cone-up, where the liquid drains to multiple sumps around the perimeter, or cone-down, typically with a single sump in the center of the tank.

Submerged Fill
See discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses).

Good Operating and Maintenance Practices
NSPS Subpart Kb requires that the process of filling, emptying, and refilling be continuous and completed as rapidly as possible.

<u>Step 2: Eliminate Technically Infeasible Options</u>

All control options are technically feasible. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

Drain dry design reduces the emissions associated with landing and cleaning events by reducing the amount of material remaining on the bottom of the tank subject to volatilization. Good operating and maintenance practices do not reduce emissions associated with individual emissions events, but instead limit event frequency and duration, decreasing potential emissions. Since these tanks will be handling crude oil and not refined products, most landings associated with changes of service can occur while keeping the roof floated and mixing the two crudes with the remaining stock/bottoms. For instances where a brief landing is required, the difference in emission rates between drain-dry tanks and partial heal tanks is negligible. Drain-dry tanks start providing more significant benefits whenever tanks are not landed and refilled in a continuous manner, such as preparing for a tank cleaning.

Routing the vapor space to a control device or mobile degassing units reduces emissions from landings and cleaning events more or less effectively depending on the destruction technology used.

Table 24: Control Technology Options for Storage Tanks – Landing

Option	Description
Baseline : NSPS Subpart Kb Standard	All filling, emptying, and refilling will be continuous and completed as rapidly as possible.
Option 1 : IFR with Vapor Collection	All EFR tanks equipped to reduce emissions with cone roof add-on, and closed vent vapor collection system routing vapors to a control device (including as-built IFR tanks)
Option 2: Over the Top Fixed Vapor Collection	EFR storage tanks with fixed vapor collection systems for each tank and all gases routed to shared control device.
Option 3: Mobile Degassing and Vapor Collection	Storage tanks have mobile degassing unit utilized during roof landing and tank cleaning events. All gases routed to a mobile control unit.

The control technologies, as listed in the following table, are in order of decreasing emission reduction potential.

Table 25. Ranking of Control Technology Options for Landings

Rank	Option
1	Option 1: IFR w/ vapor collection
2	Option 2: Over the Top Fixed Vapor Collection
3	Option 3: Mobile Degassing and Vapor Collection
4	Baseline: NSPS Subpart Kb

In addition to control effectiveness and emissions considerations, each BACT option must also be evaluated for economic impacts, environmental, and energy impacts. These considerations are further discussed in Step 4.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

As with the BACT analysis for Normal Operations (Standing and Withdrawal Losses), Tallgrass has assumed NSPS Subpart Kb requirements to be the baseline requirement since NSPS Subpart Kb requires an EFR or IFR roof.

The economic consideration for each remaining BACT option is based on an itemized cost analysis. Expenses associated with the control options include tank construction, incinerator equipment, and annual operating costs. In Table 21, the Baseline: NSPS Subpart Kb Standard costs are the baseline costs, and the remaining BACT options are estimated as the incremental or increased cost of emission control over the baseline. BACT cost is the incremental expenses in dollars, per ton of VOC reduced. The expense is the annual control cost, which includes annualized capital costs (i.e. tank construction, destruction equipment, etc.) and annual operating costs (i.e. maintenance and pilot gas). The tons of VOC reduced are conservatively estimates as the control efficiency multiplied by the baseline emission rate assuming 100% capture efficiency for destruction controls. Baseline emissions are based on the Baseline: NSPS Subpart Kb Standard configuration. For Option 1: IFR with Vapor Collection, the withdrawal and standard emissions from all the tanks were conservatively included since this option would also result in a reduction of IFR tank emissions for truck receiving operations.

Table 26: Initial Costs (Storage Tanks – Landing)

Proposed Tanks			Baseline: NSPS Subpart Kb Standard		Option 1: IFR with Vapor Collection	
Capacity	Landings hr/yr	Cleanings hr/yr	Cost/Tank	Total Cost	Cost/Tank	Total Cost
250,000	135	149	$3,481,000	$34,810,000	$3,686,000	$36,860,000
500,000	90	96	$6,962,000	$41,772,000	$7,372,000	$44,232,000
1,000	50	54	--	--	--	--
		Total		**$76,582,000**		**$81,092,000**

Table 26. (Cont.)

Proposed Tanks	Option 2: Over the Top Vapor Collection		Option 3: Mobile Degassing and Vapor Collection	
Capacity	Cost/Tank	Total Cost	Cost/hr	Total Cost
250,000	$350,000	$3,500,000	$1,480	$420,320
500,000	$350,000	$2,100,000	$1,480	$275,280
1,000	--	--	$1,480	$153,920
Total		**$5,600,000**		**$849,520**

The cost analysis considered total emissions from each group of tanks as being emitted from a single tank. This will allow the facility to utilize a "group" limit. The following tables present the cost analysis for each of the control options.

Table 27: Unit Cost Analysis for IFR w/ Vapor Collection (Landing Operations)

Capacity (bbl)	**250,000**	**500,000**	**1,000**
Tank Roofs	205,000	410,000	0
Thermal Oxidizer	886,700	886,700	373,500
Piping to TO	33,200	33,200	33,200
Direct Costs			
Total Capital Investment	1,124,900	1,329,900	406,700
Total Annual Cost	88,200	95,200	51,300
Interest	6%	6%	6%
Equipment Life (yrs)	15	15	15
Total Annual Cost	$204,023	$232,130	$93,175
Emission Reductions			
Baseline Emission (TPY)	16.4	19.2	0.04
Control Efficiency	99%	99%	99%
Emissions Reduced (TPY)	16.3	19.0	0.0
BACT Cost ($/ton)	**$12,533**	**$12,196**	**$2,256,136**

[1] IFR installation costs are based on vendor quote from Matrix PDM for complete tanks -- actual costs for retrofitting cone and dome roofs onto EFR tanks are typically higher

[2] Thermal oxidizer and associated vapor collection piping installation costs are based on EPA Control Cost Manual

[3] Annual operation costs associated with the thermal oxidizer are based on EPA Control Cost Manual

[4] Control efficiency based on EPA Control Cost Manual typical thermal oxidizer control efficiency

[5] Landing durations assume 24 hours standing idle, and 1 hour per refill event per 1K tank, 3 hours per 250K tank, and 6 hours per 500K tank

Table 28 : Unit Cost Analysis for Over the Top Fixed Vapor Collection (Landing Operations)

Capacity (bbl)	250,000	500,000	1,000
Collection System	350,000	350,000	350,000
Thermal Oxidizer	886,700	886,700	373,500
Piping to TO	33,200	33,200	33,200
Direct Costs			
Total Capital Investment	1,269,900	1,269,900	756,700
Total Annual Cost	88,200	95,200	51,300
Interest	6%	6%	6%
Equipment Life (yrs)	15	15	15
Total Annual Cost	$218,952	$225,952	$129,212
Emission Reductions			
Baseline Emission (TPY)	16.4	19.2	0.04
Control Efficiency	99%	99%	99%
Emissions Reduced (TPY)	16.3	19.0	0.0
BACT Cost ($/ton)	**$13,450**	**$11,871**	**$3,128,735**

Table 29: Unit Cost Analysis for Mobile Degassing (Landing Operations)

Capacity (bbl)	250,000	500,000	1,000
Hour/Landing	27	30	25
Thermal Oxidizer ($/hr)	1,480	1,480	1,480
Thermal Oxidizer ($/event)	39,960	44,400	37,000
Tank Mobilization	500	500	500
Direct Costs			
Total Capital Investment	40,460	44,900	37,500
Total Annual Cost	0	0	0
Interest	1%	1%	1%
Equipment Life (yrs)	1	1	1
Total Annual Cost	$40,865	$45,349	$37,875
Emission Reductions			
Baseline Emission (TPY)	3.3	6.4	0.02
Control Efficiency	95%	95%	95%
Emissions Reduced (TPY)	3.1	6.1	0.0
BACT Cost ($/ton)	**$13,080**	**$7,449**	**$1,911,439**

[1] Mobile Degassing costs are based on a recent vendor quote from ENVENT

[2] Landing durations assume 24 hours standing idle, and 1 hour per refill event per 1K tank, 3 hours per 250K tank, and 6 hours per 500K tank

[3] Control efficiency is based on typical combustor control efficiency, including startup and shutdown

Environmental impacts associated with the mobile degassing option include additional pollutants (NO_X, PM, SO_2, CO, and CO_2) from a mobile thermal oxidizer and a power generator. There are further impacts associated with mobilizing the degassing unit since it would need to be brought to the site for each landing event. The energy demands for this option include fuel usage for generators, the thermal oxidizer, and mobilization of equipment and crew. These energy demands are not common with the other BACT options presented in this analysis and are a considerable impact. Also, the uncertainty of a long-term agreement with a vendor and the uncertainty of future control costs, which can widely vary based on the vapor space composition, can significantly impact the effectiveness of this option. Therefore, the use of mobile degassing to control landings does not represent an option that would be appropriate given consideration of overall economic, environmental, and energy impacts, and this determination is in line with other EPA determinations for this control option at similar facilities. The clearinghouse listed several facilities (e.g. RBLC IDs LA-0228 and TX-0653) with crude oil storage tanks. Acceptable PSD BACT controls for these facilities were limits on the frequency and duration of tank landings. Note that some facilities listed in the RBLC (e.g., RBLC IDs TX-0800 and TX-0799) used vapor recovery controls. However, these facilities are either located in non-attainment zones or are subject to state-specific regulations.

From the tables above, the lowest available cost per ton reduced is approximately $7,449. This value may be economical, therefore further discussion may be warranted. Due to economic impact, TPY for VOC reduced, attainment status of Oklahoma, and no work practice or limits in BACT/LAER, they are considered inappropriate BACT alternatives.

Step 5: Select BACT and Document the Selection as BACT

Tallgrass proposes the following design elements and work practices as BACT:

- Good operation and maintenance practices in accordance with NSPS Subpart Kb, such as the completion of filling, emptying, and refilling in a 'continuous' manner. Tanks will be completely drained for landing events not completed in a continuous manner.

DEQ evaluated the BACT proposal from Tallgrass and agrees that their design elements and work practices are acceptable as BACT. The chosen level of BACT is consistent with findings from EPA's RBLC for similar conditions and operations.

As mentioned previously, the resulting BACT standard is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emissions standard infeasible, in which case a work practice or operating standard can be imposed. For the proposed storage tanks, DEQ selects a VOC BACT emission limit of 19.2 tons per year of VOC for all landing events for all 500K-bbl tanks, 16.4 tons per year of VOC for all landing events for all 250K-bbl tanks, and 0.04 tons per year of VOC for all landing events for all 1,000-bbl tanks.

BACT Analysis for Storage Tanks – Cleanings

Step 1: Identify Available Control Technologies

See BACT analysis for landings. All control technologies are the same except that submerged fill does not apply to cleanings.

Step 2: Eliminate Technically Infeasible Options

All control options are technically feasible. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

See BACT analysis for landings.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

The economic consideration for each BACT option is based on a cost analysis, in part, total capital costs, direct costs, and total derived annualized cost. The initial costs for each option remain the same as presented in the BACT analysis for normal operations and landings and therefore were not duplicated here. The cost analysis also considered total emissions from each group for tanks as being emitted by from a single tank. This will allow the facility to utilize a "group" tank limit.

The following tables present the cost analysis of each of the control options.

Table 30: Unit Cost Analysis for IFR w/ Vapor Collection (Cleaning Operations)

Capacity (bbl)	250,000	500,000	1,000
Tank Roofs	205,000	410,000	0
Thermal Oxidizer	886,700	886,700	397,300
Piping to TO	33,200	33,200	33,200
Direct Costs			
Total Capital Investment	1,124,900	1,329,900	430,500
Total Annual Cost	98,300	129,500	59,100
Interest	6%	6%	6%
Equipment Life (yrs)	15	15	15
Total Annual Cost	$214,123	$266,430	$103,425
Emission Reductions			
Baseline Emission (TPY)	23.6	46.1	1.4
Control Efficiency	99%	99%	99%
Emissions Reduced (TPY)	23.3	45.7	1.4
BACT Cost ($/ton)	**$9,182**	**$5,832**	**$74,325**

[1] IFR installation costs are based on vendor quote from Matrix PDM for complete tanks -- actual costs for retrofitting cone and dome roofs onto EFR tanks are typically higher

[2] Thermal oxidizer and associated vapor collection piping installation costs are based on EPA Control Cost Manual

[3] Annual operation costs associated with the thermal oxidizer are based on EPA Control Cost Manual

[4] Control efficiency based on EPA Control Cost Manual typical thermal oxidizer control efficiency

[5] Cleaning emissions and durations assume 48 hours standing idle, three sludge removal shifts for 12 hours each, three diesel washes for 12 hours each, one initial vapor purge for 16 hours for 250K tanks (24 hours for 500K, 4 hours for 1K), five vapor purges for 2 hours each, and a 3 hour refill for 250K tanks (6 hour for 500K, 1 hour for 1K)

Unit Cost Analysis for Over the Top Fixed Vapor Collection (Cleaning Operations)

Capacity (bbl)	250,000	500,000	1,000
Collection System	350,000	350,000	350,000
Thermal Oxidizer	886,700	886,700	397,300
Piping to TO	33,200	33,200	33,200
Direct Costs			
Total Capital Investment	1,269,900	1,269,900	780,500
Total Annual Cost	98,300	129,500	59,100
Interest	6%	6%	6%
Equipment Life (yrs)	15	15	15
Total Annual Cost	$229,052	$260,252	$139,462
Emission Reductions			
Baseline Emission (TPY)	23.6	46.1	1.4
Control Efficiency	99%	99%	99%
Emissions Reduced (TPY)	23.3	45.7	1.4
BACT Cost ($/ton)	**9,823**	**5,697**	**100,222**

[1] Thermal oxidizer and associated vapor collection piping installation costs are based on EPA Control Cost Manual

[2] Annual operation costs associated with the thermal oxidizer are based on EPA Control Cost Manual

[3] Control efficiency based on EPA Control Cost Manual typical thermal oxidizer control efficiency

[4] Over the Top Fixed Vapor Collection cost based on previous BACT cost analysis by Plains (Permit No. 2003-104-C (M-4) PSD)

[5] Cleaning emissions and durations assume 48 hours standing idle, three sludge removal shifts for 12 hours each, three diesel washes for 12 hours each, one initial vapor purge for 16 hours for 250K tanks (24 hours for 500K, 4 hours for 1K), five vapor purges for 2 hours each, and a 3 hour refill for 250K tanks (6 hour for 500K, 1 hour for 1K)

Unit Cost Analysis for Mobile Degassing (Cleaning Operations)

Capacity (bbl)	250,000	500,000	1,000
Hour/Cleaning	149	160	135
Thermal Oxidizer ($/hr)	1,480	1,480	1,480
Thermal Oxidizer ($/event)	220,520	236,800	199,800
Tank Mobilization	500	500	500
Direct Costs			
Total Capital Investment	221,020	237,300	200,300
Total Annual Cost	0	0	0
Interest	1%	1%	1%
Equipment Life (yrs)	1	1	1
Total Annual Cost	$223,230	$239,673	$202,303
Emission Reductions			
Baseline Emission (TPY)	23.6	46.1	1.4
Control Efficiency	95%	95%	95%
Emissions Reduced (TPY)	22.4	43.8	1.3
BACT Cost ($/ton)	**9,976**	**5,467**	**151,503**

[1] Mobile Degassing costs are based on a recent vendor quote from ENVENT

[2] Control efficiency is based on typical combustor control efficiency, including startup and shutdown

[3] Cleaning emissions and durations assume 48 hours standing idle, three sludge removal shifts for 12 hours each, three diesel washes for 12 hours each, one initial vapor purge for 16 hours for 250K tanks (24 hours for 500K, 4 hours for 1K), five vapor purges for 2 hours each, and a 3 hour refill for 250K tanks (6 hour for 500K, 1 hour for 1K)

Environmental impacts associated with the mobile degassing option include additional pollutants (NO_X, PM, SO_2, CO, and CO_2) from a mobile thermal oxidizer and a power generator. There are further impacts associated with mobilizing the degassing unit since it would need to be brought to the site for each landing event. The energy demands for this option include fuel usage for generators, the thermal oxidizer, and mobilization of equipment and crew. These energy demands are not common with the other BACT options presented in this analysis and are a considerable impact. Also, the uncertainty of a long-term agreement with a vendor and the uncertainty of future control costs, which can widely vary based on the vapor space composition, can significantly impact the effectiveness of this option. Therefore, the use of mobile degassing to control cleanings does not represent an option that would be appropriate given consideration of overall economic, environmental, and energy impacts, and this determination is in line with other EPA determinations for this control option at similar facilities. The clearinghouse listed several facilities (e.g. RBLC IDs LA-0228 and TX-0653) with crude oil storage tanks. Acceptable PSD BACT controls for these facilities were limits on the frequency and duration of tank cleanings. Note that some facilities listed in the RBLC (e.g., RBLC IDs TX-0800 and TX-0799) used vapor recovery controls. However, these facilities are either located in non-attainment zones or are subject to state-specific regulations.

From the tables above, the lowest available cost per ton reduced is approximately $5,467. This value may be economical, therefore further discussion may be warranted. Due to economic impact, TPY for VOC reduced, attainment status of Oklahoma, and no work practice or limits in BACT/LAER, they are considered inappropriate BACT alternatives.

Step 5: Select BACT and Document the Selection as BACT

Tallgrass proposes the following design elements and work practices as BACT:

- Good operation and maintenance practices.

DEQ evaluated the BACT proposal from Tallgrass and agrees that their proposal is acceptable as BACT. The chosen level of BACT is consistent with findings from EPA's RBLC for similar conditions and operations.

As mentioned previously, the resulting BACT standard is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emissions standard infeasible, in which case a work practice or operating standard can be imposed. For the proposed storage tanks, DEQ selects a VOC BACT emission limit of 46.1 tons per year of VOC for all 500K-bbl tanks, 47.1 tons per year of VOC for all 250K-bbl tanks, and 1.41 tons per year of VOC for all 1,000-bbl tanks.

BACT Analysis for Fugitive Equipment Leaks

Step 1: Identify Available Control Technologies

For most source types, the EPA's RACT/BACT/LAER Clearinghouse (RBLC) is the preferred reference. However, there were no results found for this source type at a crude oil terminal in the RBLC. The following table lists commercially available controls based on results found for other types of petroleum liquid storage and the control techniques outlined in EPA's Background Technical Support Document for the Proposed New Source Performance Standards 40 CFR Part 60, Subpart OOOOa. The control technologies are listed in order of decreasing emission reduction potential.

Table 23. Control Technologies for Fugitive Equipment Leaks

Control Technologies
Leak Detection and Repair Program (LDAR) • Method 21 • Optical Gas Imaging (OGI) • Audio, Visual, & Olfactory (AVO) Good Operating and Maintenance Practices

Leak Detection and Repair Program

An LDAR program is a system of procedures that an operator utilizes to locate and repair leaking fugitive components (e.g., valves, pumps, connectors, compressors, etc.) in order to minimize VOC emissions. LDAR programs involving Method 21, OGI, and AVO monitoring are already required by a number of NSPS Subparts, but none of these currently affect crude oil terminals.

Good Operating and Maintenance Practices

Good operating and maintenance practices involve good housekeeping, timely repair of leaking components, and compliance with other federal regulations such as the inspection requirements in a Spill Prevention, Control, and Countermeasures (SPCC) Plan.

<u>Step 2: Eliminate Technically Infeasible Options</u>

All control options are technically feasible when considered individually. These options are further considered in the following steps of the top-down BACT analysis.

<u>Step 3: Rank Remaining Control Options by Control Effectiveness</u>

The reductions associated with LDAR Programs vary depending on the frequency, leak definition, and type of monitoring. Quarterly monitoring using Method 21 can achieve an emissions reduction as high as 95 percent for valves in light liquid service.[5] Up to 80 percent control efficiency is achievable via quarterly OGI monitoring.[6] The control efficiency for weekly AVO inspections is 30 percent.[7]

<u>Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts</u>

Since good operating and maintenance are already required by the SPCC Plan, this is considered the baseline option.

The economic consideration for each remaining option is based on the cost analysis in the following table.

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[5] U.S. EPA, *Protocol for Equipment Leak Emission Estimates*, November 1995, p. 5-10. (EPA-453/R-95-017)

[6] U.S. EPA, *Background Technical Support Document for NSPS Subpart OOOOa.*

[7] Texas Commission on Environmental Quality, *TCEQ publication RG-360A - Technical Supplement 3: Equipment Fugitive Leaks*, January 2007, p. A-33.
(https://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg360/rg-360-06/techsupp_3.pdf)

Table 24. Cost Analysis for Fugitive Equipment Leaks

Analysis Element	LDAR Program with Method 21 Monitoring	LDAR Program with OGI Monitoring	LDAR Program with AVO Monitoring
Inspection Labor ($/hr)	$120	$120	$39
Annual Inspection Hours	64	48	48
Maintenance Labor & Parts ($/hr)	$86	$86	$86
Annual Maintenance Hours	32	32	32
Annual Program Records/Reports ($)	$2,500	$1,500	$1,500
Total Annual Cost ($)	**$12,932**	**$10,012**	**$6,124**
Baseline Emissions (TPY)	1.80	1.80	1.80
Control Efficiency	95%	80%	30%
Emissions Reduced (TPY)	1.71	1.44	0.54
BACT Cost ($/ton reduced)	**$7,572**	**$6,961**	**$11,355**

[1] Inspection labor for M21 & OGI based on contractor quote.
[2] Inspection labor for AVO based on average engineering wages for Tulsa, OK published by the Bureau of Labor Statistics.
[3] Inspection/maintenance hours based on quarterly inspections for similarly-sized facilities.
[4] Maintenance labor and parts based on guidance in EPA's Control Cost Manual (labor is 110% of inspection labor and the cost for parts is equivalent to maintenance labor).
[5] LDAR program recordkeeping and reporting based on contractor quote.
[6] M21 reduction is for valves in light liquid service – the reduction for other components would be less.

From the table above, the lowest available cost per ton reduced is $6,961. This value may be economical, therefore further discussion may be warranted. Due to economic impact, TPY for VOC reduced, attainment status of Oklahoma, and no work practice or limits in BACT/LAER, they are considered inappropriate BACT alternatives.

The control options evaluated have no significant environmental or energy impacts other than the impacts associated with contractor mobilization. Since the economic impacts for each of the options are unreasonably high, these impacts were not considered in greater detail.

Step 5: Select BACT and Document the Selection as BACT

Given the small quantity of emissions from these activities, the applicant proposes good housekeeping and compliance with the inspection requirements in SPCC Plan as BACT. Further, the Texas Commission on Environmental Quality (TCEQ) has published NSR guidance for equipment leak fugitives indicating no control is necessary for fugitives below 10 TPY, which has been relied upon in other applications in Region 6 of EPA. DEQ evaluated the BACT proposal from Tallgrass and agrees that their proposal is acceptable as BACT.

BACT Analysis for Reciprocating Internal Combustion Engines

Step 1: Identify Available Control Technologies

Tallgrass will operate an emergency generator driven by a stationary diesel-fired RICE with a nominal power output capacity of 450-hp. This RICE is subject to recently promulgated NSPS and NESHAP regulations at 40 CFR part 60, Subpart IIII and 40 CFR part 63, Subpart ZZZZ, respectively. These regulations require Tallgrass to purchase a RICE certified to applicable Tier Standards, combust only ultra-low sulfur diesel (ULSD), and conduct various monitoring, recordkeeping, and reporting, and these requirements are taken as the baseline for this BACT analysis.

Available VOC emission control options for diesel-fired, i.e., compression ignition (CI), RICE include:

(a) Oxidation catalyst, or, more specifically, diesel oxidation catalyst (DOC) and
(b) Good combustion practices (GCP).

DOC utilizes a catalyst such as platinum or palladium to further oxidize the engine's exhaust, which includes hydrocarbons (HC), e.g., VOC, to carbon dioxide (CO_2) and water. Use of DOC can result in approximately 90 percent reduction in HC/VOC emissions.[8] However, for emergency-use or intermittent-use engines, "[b]ecause these engines are typically used only a few number of hours per year…[s]uch engines rarely if ever use the [DOC] type of emission controls."[9] Queries of the RBLC reveals no installations of DOC on emergency, diesel-fired engines or on non-road, diesel-fired engines.[10] DOC is nonetheless carried forward in this BACT analysis.

GCP for CI RICE for VOC control consists of minimizing startup and idling time. This is achieved in normal practice for emergency-use engines that, by design, only operate for maintenance purposes, readiness testing, and during emergency events.

Step 2: Eliminate Technically Infeasible Options

Both control options identified in step 1 are technically feasible.

Step 3: Rank Remaining Control Options by Control Effectiveness

The more effective control option from steps 1 and 2 is DOC, which can theoretically achieve approximately 90 percent reduction in VOC emissions. GCP is a part of normal practice for emergency-use engines so no additional VOC reduction can be attributed.

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[8] U.S. EPA, *Alternative Control Techniques Document: Stationary Diesel Engines*, March 5, 2010, p. 41. (https://www.epa.gov/sites/production/files/2014-02/documents/3_2010_diesel_eng_alternativecontrol.pdf)

[9] U.S. EPA, Memorandum: *Response to Public Comments on Proposed National Emission Standards for Hazardous Air Pollutants for Existing Stationary Reciprocating Internal Combustion Engines Located at Area Sources of Hazardous Air Pollutant Emissions or Have a Site Rating Less Than or Equal to 500 Brake HP Located at Major Sources of Hazardous Air Pollutant Emissions*, August 10, 2010, p. 172-173. (EPA-HQ-OAR-2008-0708)

[10] RBLC Basic Search queries were completed on December 22, 2016, for process types 17.110 and 17.210. Query results were filtered to only show records for VOC emissions from diesel fuel-fired engines.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

The use of DOC reduces the effective power output of RICE and results in a solid waste stream. However, for the purposes of this analysis, no formal consideration of these adverse energy and environmental impacts is presented. GCP is part of normal practice for emergency-use engines so no cost is associated with that option.

In its 2010 MACT/GACT evaluation for engines, EPA concluded for emergency engines: "Because these engines are typically used only a few number of hours per year (27 hours per year per NFPA codes), the costs of emission control are not warranted when compared to the emission reductions that would be achieved."[11] Based on EPA's assessment and the fact that the RBLC contains no records of DOC installation on emergency-use or non-road engines, DOC is eliminated from consideration as BACT. This conclusion is substantiated by multiple state and local regulatory authorities, including the San Joaquin Valley Air Pollution Control District (APCD)

Step 5: Select BACT and Document the Selection as BACT

The remaining control option, GCP, is selected as BACT. As stated above, GCP for emergency engines is normal practice, i.e., operating the engines only for maintenance purposes, readiness testing, and during emergencies.

BACT Analysis for Pigging Operations

Step 1: Identify Available Control Technologies

After reviewing the RBLC, there were no results found for this emission source. No additional control options were identified after reviewing air permits from similar facilities in Oklahoma and surrounding states. After reviewing typical industry practices, the only option identified was good operating and maintenance practices.

Good operating and maintenance practices involve good housekeeping, minimizing the duration and frequency of the pigging operations, and minimizing spills in accordance with an SPCC Plan.

Step 2: Eliminate Technically Infeasible Options

The one control option identified is technically feasible.

Step 3: Rank Remaining Control Options by Control Effectiveness

Only one control option was identified.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

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[11] Ibid.

Only one control option was identified, and it is assumed to be economically feasible without significant adverse energy or environmental impacts.

Step 5: Select BACT and Document the Selection as BACT

Tallgrass proposes good housekeeping including compliance with the quarterly inspection requirements in the SPCC Plan as BACT.

BACT Analysis for Sump Tanks

Step 1: Identify Available Control Technologies

After reviewing the RBLC, there were no results found for this emission source at a petroleum terminal. No additional control options were identified after reviewing air permits from similar facilities in Oklahoma and surrounding states. After expanding the RBLC search to include other types of facilities, and after reviewing typical industry practices, the following control options were identified:

Routing Vapor Space to a Control Device
See discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses).

Submerged Fill
See discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses).

Good Operating and Maintenance Practices
Good operating and maintenance practices involve good housekeeping and compliance with other federal regulations such as the inspection requirements in an SPCC Plan.

Step 2: Eliminate Technically Infeasible Options

All control options are technically feasible when considered individually. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

The most effective option is Routing Vapor Space to a Control Device, followed by Submerged Fill and Good Operating and Maintenance Practices.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

Since good operating and maintenance are already required by the SPCC Plan, this is considered the baseline option.

Submerged fill is assumed to be economically feasible without significant adverse energy or environmental impacts.

For the Routing Vapor Space to a Control Device option, the cost of piping alone is expected to exceed $130,000 (annualized cost is $13,385) using estimates from the *EPA Air Pollution Control Cost Manual*, which represents an infeasible economic impact since the emissions reduction would only be 0.5 tpy assuming a 99% destruction efficiency. Due to the extremely high and unreasonable economic impact for this BACT option, it is an inappropriate BACT alternative beyond the other options. Additionally, environmental and energy impacts from this option include an increase in NO_X and CO emissions, noise, and fuel consumption.

Step 5: Select BACT and Document the Selection as BACT

Tallgrass proposes submerged fill and good housekeeping including compliance with the quarterly inspection requirements in the SPCC Plan as BACT. DEQ evaluated the BACT proposal from Tallgrass and agrees that their proposal is acceptable as BACT.

B. Evaluation of Existing Air Quality and Determination of Monitoring Requirements

Ozone (O_3) Monitoring

Pre-construction monitoring for ozone is required for any new source or modified existing source located in an unclassified or attainment area with greater than 100 tons per year of VOC emissions. Continuous ozone monitoring data must be used to establish existing air quality concentrations in the vicinity of the proposed source or modification.

The siting guidance for ozone monitors in the "Ambient Monitoring Guidelines for Prevention of Significant Deterioration", EPA-450/4-87-007, is less prescriptive than the guidance for primary pollutants. The guidance provides that, where the NO interactions may be minimal, the travel time to expected maximum ozone concentrations may be 3 to 4 hours downwind; but "in general, the downwind distance for the maximum ozone site should not be more than 15 to 20 miles from the source because a lower wind speed (2-3 miles per hour) with less dilution would be a more critical case." Reviewing wind roses from met stations in Cushing, Stillwater, and Oilton, wind speeds are generally greater than a minimum of 5 miles per hour with primary flow vectors (blowing to) ranging between NW and NE.

The nearest existing ozone monitoring site is the Tulsa West site, 40-037-0144 at 25 miles NE of the proposed project. The current ozone design value for Tulsa West is 0.063 ppm.

The Tulsa West monitoring site is part of the Tulsa Metropolitan Statistical Area and would be impacted by pollution from urban area sources and significant individual point sources. Ozone concentrations measured at this site should be considered conservative for the community of Cushing and the surrounding area including the crude oil tank farms. This determination is corroborated by the fact that the terrain in both areas is relatively flat, emission inventories and photochemical modeling[12] has shown the area to be NO_X limited and there are no significant NO_X emission sources in or around Cushing. While Cushing has a large number of crude oil storage tanks and associated VOC emissions, due to the relative scarcity of NO_X emissions, increases in VOC are not expected to significantly impact ozone concentrations. Therefore, use of the monitoring data collected at the Tulsa West monitoring site is presumed to satisfy preconstruction monitoring requirements.

Table 25. List of Nearby Oklahoma Ozone Monitors

Site	Name	Distance	Average 4th High 2014-2016	Average 4th High 2015-2017*
40-143-0174	Tulsa South	42 miles E	0.062 ppm	0.063 ppm
40-037-0144	**Tulsa West**	**25 miles NE**	**0.064 ppm**	**0.063 ppm**
40-109-0096	Choctaw	44 miles SW	0.065 ppm	0.067 ppm
40-109-1037	OKC North	46 miles SW	0.068 ppm	0.069 ppm

*The average of the 4th high monitored 8-hour ozone values from 2015 through September 18 of 2017.

C. Air Quality Impacts Analysis

Ozone Modeling

EPA conducted photochemical modeling studies to provide guidance on the development of Modeled Emission Rates for Precursors (MERPs). These MERPs are intended to be used, where appropriate, as a Tier I demonstration tool for ozone and secondary formation $PM_{2.5}$ evaluation requirements under PSD. The draft guidance was released for public review and comment on December 2, 2016. The guidance uses conservative assumptions to evaluate hypothetical single-source impacts on downwind O_3. The parameters relied upon are documented in EPA document number EPA-454/R-16-006, December 2016.

The new VOC emission sources under review in this permit are six (6) 500,000-bbl and ten (10) 250,000-bbl external floating roof tanks, four (4) 1,000-bbl internal floating roof tanks, and associated fugitives. The facility also anticipates 0.74 tons per year of NO_X emissions from one (1) intermittent limited use engine. The highest and most common release height for emissions is 16.9 meters. Emissions from the storage tanks were developed with the calculation methodology outlined in AP 42, Ch. 7.1 and assuming a crude oil with an RVP of 9

In EPA's draft guidance Table 7.1 breaks the country up into three regions and identifies the most conservative (lowest) illustrative MERP Values in tons per year by precursor, pollutant, and region. The analysis identified an Ozone MERP for VOC precursors of 948 tons per year for the central region. When narrowing it down to a low level VOC source in Canadian and Muskogee counties, the MERP increases to 7,143 and 3,571 tons per year respectively. In deriving the lowest MERP values, EPA explored impacts from surface level releases and high level, 90 meter, releases of precursor pollutants. Emissions were modeled using a typical industrial speciation for VOCs.

[12] Ramboll Environ US Corporation. 2015Assessment of the Ozone Impacts Associated with New Emissions from Tinker Air Force Base in Oklahoma City.

Sensitivity analyses identified that using more reactive assumptions such as speciating VOCs as formaldehyde increased concentration by a factor of 1.5 to 2. The critical air quality threshold for ozone or Significant Impact Level, SIL, used to derive the MERP was 1.0 part per billion (ppb).

Table 26. Oklahoma MERP Values based on EPA

Location	Modeled Emission Rate	Modeled Concentration	MERP	MERP adjusted for Reactivity
	TPY	PPB	TPY	TPY
Canadian County	500	0.07	7,143	3,572
Muskogee County	500	0.14	3,571	1,785

Photochemical modeling was conducted in August of 2015 on behalf of Tinker Air Force Base by Ramboll Environ. The modeling study was based on a Texas Commission on Environmental Quality (TCEQ) developed Photochemical Grid Model (PGM) modeling database for ozone episodes in June of 2012. The TCEQ episodes included high monitored ozone concentrations in Oklahoma as well. The Comprehensive Air-quality Model with extensions version 6.11 with the Carbon Bond 6 revision 2 chemical mechanism was used in the study. The TCEQ database used a 36 km continental U.S. (CONUS) and a 12 km Texas-Oklahoma domain. These domains were retained and a new 4 km OKC/Tulsa modeling domain was added. This new domain included the Cushing area. The 4 km domain-wide 8-hour ozone performance statistics achieved EPA's performance goals with a slight overestimation bias.

Using the method provided in the draft EPA guidance, modeling conducted on behalf of Tinker for 608 tons per year of VOCs would yield an unadjusted MERP consistent with the values provided by EPA.

Table 27. Calculated MERP Based on Tinker Modeling

Location	Modeled Emission Rate	Modeled Concentration	MERP
	TPY	PPB	TPY
Tinker	608	0.10	6,080

The critical air quality threshold for ozone or SIL, of 1.0 ppb should not be relied upon without justification. However, given the conservative design value for the Cushing area was established by the Tulsa West monitor at 63 ppb and that the ozone impact from the tank farm expansion and VOC increase of 223.17 TPY would be a relative ozone increase in the neighborhood of 0.04 ppb, the project is anticipated to be well below any reasonably established significant impact level and therefore no further evaluation is necessary.

D. Evaluation of Additional Source-Related Impacts

Growth Impact Analysis

A growth analysis is intended to quantify the amount of new growth that is likely to occur in support of the facility and to estimate emissions resulting from that associated growth. Associated growth includes residential and commercial/industrial growth resulting from the new facility. Residential growth depends on the number of new employees and the availability of housing in the area, while associated commercial and industrial growth consists of new sources providing services to the new employees and the facility. Tallgrass does not expect that any additional residential and commercial or industrial growth will result from these new employees since the facility is located in an area that has an available population to supply employees and the area is already commercially and industrially developed. Therefore, additional growth from the facility is expected to be minimal.

Soils and Vegetation

The following discussion will review the project's potential to impact its agricultural surroundings based on the facility's allowable emission rates and resulting ground level concentrations of VOC.

The effects of gaseous air pollutants on vegetation may be classified into three rather broad categories: acute, chronic, and long-term. Acute effects are those that result from relatively short (less than 1 month) exposures to high concentrations of pollutants. Chronic effects occur when organisms are exposed for months or even years to certain threshold levels of pollutants. Long-term effects include abnormal changes in ecosystems and subtle physiological alterations in organisms. Acute and chronic effects are caused by the gaseous pollutant acting directly on the organism, whereas long-term effects may be indirectly caused by secondary agents such as changes in soil pH.

VOC is regulated by the EPA as a precursor to tropospheric ozone. Elevated ground-level ozone concentrations can damage plant life and reduce crop production. Also, VOC interferes with the ability of plants to produce and store food, making them more susceptible to disease, insects, other pollutants and harsh weather. The terminal is located in an area with elevated VOC background emissions due to the vegetation and existing tank farms in Cushing. Therefore, the formation of ozone as a result of the new storage tank emissions of precursors is NO_X limited. Since there are minimal NO_X emissions from the facility, no significant impact on soil and vegetation is expected due to VOC emissions from the project.

Visibility Impairment

The project is not expected to produce any perceptible visibility impacts in the immediate vicinity of the terminal. Given the limitation of 20% opacity of emissions, and a reasonable expectation that normal operation of the Tallgrass Terminal will result in < 20% opacity, no immediate visibility impairment is anticipated.

E. Evaluation Of Class I Area Impacts

One of the purposes of the PSD program is "to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value." Under the PSD provisions, Congress established a land classification scheme for these areas of the country (Class I), specifically including:

- international parks;
- national wilderness areas which exceed 5,000 acres in size;
- national memorial parks which exceed 5,000 acres in size; and
- national parks which exceed six thousand acres in size.

Class I area analyses, when requested, typically include a Class I PSD Increment Assessment for NOx, SO_2, and PM_{10}, and an Air Quality Related Values (AQRV) assessment including a visibility analysis for increases in visibility impairing pollutants and a deposition analysis for nitrogen and sulfur deposition.

In October 2010, The Federal Land Managers AQRV Workgroup (FLAG) Phase I Report – Revised (FLAG 2010) set a threshold ratio of emissions to distance, below which an AQRV review is not required. Specifically, if Q (tpy) / d (km) < 10, no AQRV analysis is required. 'Q' is the combined emissions increase of sulfur dioxide (SO_2), oxides of nitrogen (NOX), particulate matter less than 10 microns (PM_{10}), and sulfuric acid mist (H_2SO_4) in tons per year (tpy) based on 24-hour maximum allowable emissions (which are annualized) and 'd' is the nearest distance to a Class I area in kilometers (km).

For the proposed project, the expected emissions of SO_2, NO_X, PM_{10}, and H_2SO_4 are 1.0 tpy. The closest Class I area to the Tallgrass Terminal is the Wichita Mountains at about 200 km, but this project is not expected to impact any AQRVs because the ratio of Q/d is less than 10. Therefore, further analysis is not required.

SECTION VI. OKLAHOMA AIR POLLUTION CONTROL RULES

OAC 252:100-1 (General Provisions) [Applicable]
Subchapter 1 includes definitions but there are no regulatory requirements.

OAC 252:100-2 (Incorporation by Reference) [Applicable]
This subchapter incorporates by reference applicable provisions of Title 40 of the Code of Federal Regulations. These requirements are addressed in the "Federal Regulations" section.

OAC 252:100-3 (Air Quality Standards and Increments) [Applicable]
Subchapter 3 enumerates the primary and secondary ambient air quality standards and the PSD increments. The primary standards are enumerated in Appendix E and the secondary standards are enumerated in Appendix F of the Air Pollution Control Rules (OAC 252:100). NAAQs are established by the EPA. The actual ambient air concentrations of criteria pollutants are monitored

within the State of Oklahoma by the DEQ Air Quality Division. At this time, all of Oklahoma is in "attainment" of these standards.

OAC 252:100-5 (Registration, Emissions Inventory, and Annual Operating Fees) [Applicable]
Subchapter 5 requires sources of air contaminants to register with Air Quality, file emission inventories annually, and pay annual operating fees based upon total annual emissions of regulated pollutants. The owner/operator will be required to submit emissions inventories and pay the appropriate fees.

OAC 252:100-8 (Permits for Part 70 Sources) [Applicable]
Part 5 includes the general administrative requirements for part 70 permits. Any planned changes in the operation of the facility which result in emissions not authorized in the permit and which exceed the "Insignificant Activities" or "Trivial Activities" thresholds require prior notification to AQD and may require a permit modification. Insignificant activities mean individual emission units that either are on the list in Appendix I (OAC 252:100) or whose actual calendar year emissions do not exceed the following limits:

- 5 TPY of any one criteria pollutant; and
- 2 TPY of any one hazardous air pollutant (HAP) or 5 TPY of multiple HAPs or 20% of any threshold less than 10 TPY for a HAP that the EPA may establish by rule.

Emission limitations and operational requirements necessary to assure compliance with all applicable requirements for all sources are taken from the existing permit or from the current permit application, or are developed from the applicable requirement.

OAC 252:100-9 (Excess Emissions Reporting Requirements) [Applicable]
Except as provided in OAC 252:100-9-7(a)(1), the owner or operator of a source of excess emissions shall notify the Director as soon as possible but no later than 4:30 p.m. the following working day of the first occurrence of excess emissions in each excess emission event. No later than thirty (30) calendar days after the start of any excess emission event, the owner or operator of an air contaminant source from which excess emissions have occurred shall submit a report for each excess emission event describing the extent of the event and the actions taken by the owner or operator of the facility in response to this event. Request to be relieved from an administrative penalty, as described in OAC 252:100-9-8, shall be included in the excess emission event report. Additional reporting may be required in the case of ongoing emission events and in the case of excess emissions reporting required by 40 CFR Parts 60, 61, or 63.

OAC 252:100-13 (Open Burning) [Applicable]
Open burning of refuse and other combustible material is prohibited except as authorized in the specific examples and under the conditions listed in this subchapter.

OAC 252:100-19 (Particulate Matter) [Applicable]
Section 19-4 regulates emissions of PM from new and existing fuel-burning equipment, with emission limits based on maximum design heat input rating. Fuel-burning equipment is defined in OAC 252:100-19 as any internal combustion engine or gas turbine, or other combustion device used to convert the combustion of fuel into usable energy. Thus, the engines are subject to the

requirements of this subchapter. Appendix C specifies a PM emission limitation of 0.60 lbs/MMBTU for all equipment at this facility with a heat input rating of 10 MMBUTH or less. Appendix C specifies a PM emission limitation for all equipment at this facility with a heat input rating of greater than 10 MMBTUH but less than 1,000 MMBTUH based on the following calculation: $E = 1.0428080X^{-0.238561}$, where E is the allowable emission rate and X is the maximum heat input. Based on AP-42 emission factors, the engines will be in compliance.

Unit ID	Maximum Heat Input (MMBTUH)	Emissions (lb/MMBTU)	
		Appendix C	Potential
GEN-1	7.0	0.60	0.05 [1]

[1] – Based on EPA's Tier 3 standards (NSPS Subpart IIII, Table 4)

This subchapter also limits emissions of particulate matter from industrial processes and direct-fired fuel-burning equipment based on their process weight rates. Since there are no significant particulate emissions from the nonfuel-burning processes at the facility compliance with the standard is assured without any special monitoring provisions.

OAC 252:100-25 (Visible Emissions and Particulates) [Applicable]
No discharge of greater than 20% opacity is allowed except for short-term occurrences that consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity. Since there are no significant fuel-burning or PM producing activities, compliance is assured.

OAC 252:100-29 (Fugitive Dust) [Applicable]
No person shall cause or permit the discharge of any visible fugitive dust emissions beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or interfere with the maintenance of air quality standards. Under normal operating conditions, this facility is not expected to cause a problem in this area, therefore it is not necessary to require specific precautions to be taken.

OAC 252:100-31 (Sulfur Compounds) [Applicable]
Part 2 limits ambient air concentration impacts of hydrogen sulfide (H_2S) to 0.2 parts per million (ppm) (24-hour average). The majority of the crude stored at the tank farm is of the "sweet" variety (i.e., negligible-to-very low sulfur content, < 0.5%), but sour crude (sulfur content < 5.0 wt%) may occasionally be stored. Sour crude < 5.0 wt % sulfur typically contains < 135 parts per million by weight (ppmw) H_2S on average. Screen modeling using AERSCREEN (version 15181) was conducted to demonstrate compliance with the ambient standard. For the purposes of modeling the worst-case H2S concentration at an ambient receptor, emissions during July from the EFR tanks at the Cushing South Tank Farm were modeled as a circular area source using a single 250,000-bbl EFR tank along the fence line. Emissions from the IFR tanks were modeled as a pseudo-point source using a single 1,000-bbl IFR tank along the fence line. AERSCREEN estimates the worst-case 1-hr average concentrations based on meteorological data, terrain, and building downwash. AERSCREEN automatically provides impacts for other averaging periods (3-hr, 8-hr, 24-hr, and annual) using worst-case scaling ratios or averaging time factors; however, for

area sources, all other averaging periods are equal to the 1-hour average concentration. AERSCREEN is a single source model; therefore, impacts are directly related to emission rates. The modeling was conducted with an emission rate of 1.0 lb/hr. The modeled 24-hr average concentrations were then multiplied by the maximum H_2S emission rates of 0.316 lb/hr for EFR tanks and 0.011 lb/hr for IFR tanks. The resulting modeled impact for H_2S is 69.42 $\mu g/m^3$ (24-hr average), which is in compliance with the limit of 0.2 ppm (283 $\mu g/m^3$ based on EPA standard conditions) (24-hour average). Furthermore, estimates based on refined modeling using AERMOD indicate modeled 24-hr impacts are approximately 20% of the modeled 1-hr impacts for area sources.

OAC 252:100-33 (Nitrogen Oxides) [Not Applicable]
This subchapter limits NOx emissions from new fuel-burning equipment with rated heat input greater than or equal to 50 MMBTUH to emissions of 0.2 lb of NOx per MMBTU. Fuel burning equipment is not present at the facility; therefore, this subchapter does not apply.

OAC 252:100-35 (Carbon Monoxide) [Not Applicable]
None of the following affected processes are located at this facility: gray iron cupola, blast furnace, basic oxygen furnace, petroleum catalytic cracking unit, or petroleum catalytic reforming unit.

OAC 252:100-37 (Volatile Organic Compounds) [Applicable]
Part 3 requires storage tanks constructed after December 28, 1974, with a capacity between 400 and 40,000 gallons and storing a VOC with a vapor pressure greater than 1.5 psia to be equipped with a permanent submerged fill pipe or with an organic vapor recovery system. All of the new tanks have a capacity greater than 40,000 gallons.
Part 3 requires storage tanks constructed after December 28, 1974, with a capacity greater than 40,000 gallons to be equipped with a floating roof or a vapor-recovery system capable of collecting 85% or more of the uncontrolled VOCs. All of the external floating roof tanks on-site that would be subject to this requirement are equipped with external floating roofs. However, these tanks are subject to the equipment standards of NSPS Subpart Kb and are therefore exempt from this section.
Part 5 limits the VOC content of coatings from any coating line or other coating operation. Painting operations will involve maintenance coatings of buildings and equipment emitting less than 100 pounds per day of VOC, which are exempt.
Part 7 requires fuel-burning and refuse-burning equipment to be operated to minimize emissions of VOC. The engines will be operated based on manufacturer's recommendations to ensure proper combustion.
Part 7 requires all effluent water separator openings which receive water containing more than 200 gallons per day of any VOC, to be sealed or the separator to be equipped with an external floating roof or a fixed roof with an internal floating roof or a vapor recovery system. No effluent water separators are located at this facility.

OAC 252:100-42 (Toxic Air Contaminants (TAC)) [Not Applicable]
This subchapter regulates toxic air contaminants (TAC) that are emitted into the ambient air in areas of concern (AOC). Any work practice, material substitution, or control equipment required by the Department prior to June 11, 2004, to control a TAC, shall be retained, unless a modification is approved by the Director. Since no AOC has been designated there are no specific requirements for this facility at this time.

OAC 252:100-43 (Testing, Monitoring, and Recordkeeping) [Applicable]
This subchapter provides general requirements for testing, monitoring and recordkeeping and applies to any testing, monitoring or recordkeeping activity conducted at any stationary source. To determine compliance with emission limitations or standards, the Air Quality Director may require the owner or operator of any source in the state of Oklahoma to install, maintain and operate monitoring equipment or to conduct tests, including stack tests, of the air contaminant source. All required testing must be conducted by methods approved by the Air Quality Director and under the direction of qualified personnel. A notice-of-intent to test and a testing protocol shall be submitted to Air Quality at least 30 days prior to any EPA Reference Method stack tests. Emissions and other data required to demonstrate compliance with any federal or state emission limit or standard, or any requirement set forth in a valid permit shall be recorded, maintained, and submitted as required by this subchapter, an applicable rule, or permit requirement. Data from any required testing or monitoring not conducted in accordance with the provisions of this subchapter shall be considered invalid. Nothing shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed.

The following Oklahoma Air Pollution Control Rules are not applicable to this facility:

OAC 252:100-11	Alternative Emissions Reduction	Not requested
OAC 252:100-15	Mobile Sources	Not in source category
OAC 252:100-17	Incinerators	Not type of emission unit
OAC 252:100-23	Cotton Gins	Not type of emission unit
OAC 252:100-24	Grain Elevators	Not in source category
OAC 252:100-39	Nonattainment Areas	Not in area category
OAC 252:100-47	Municipal Solid Waste Landfills	Not in source category

SECTION VII. FEDERAL REGULATIONS

PSD, 40 CFR Part 52 [Applicable]
The facility is a listed source having petroleum storage and transfer units with a total storage capacity exceeding 300,000-barrels (bbl) which emits, or has the potential to emit, 100 TPY or more of any regulated NSR pollutant. The potential emissions of the facility are greater than 100 TPY for VOC. Therefore, the facility is a major source and is subject to PSD review. The PSD review is discussed in Section VI of this memorandum.

NSPS, 40 CFR Part 60 [Subparts Kb and IIII are Applicable]
Subpart Kb, VOL Storage Vessels. This subpart applies to volatile organic liquids storage vessels (including petroleum liquids storage vessels) for which construction, reconstruction, or modification commenced after July 23, 1984, and which have a capacity of 19,813 gallons (75 cubic meters) or more. 40 CFR Part 60.112b specifies that vessels with a design capacity greater than or equal to 39,980 gallons containing a VOL that, as stored, has a maximum true vapor pressure greater than or equal to 0.75 psia but less than 11 psia shall have one of the following vapor control devices: an external fixed roof in combination with an internal floating roof; an external floating roof; a closed vent system to a control device (flare, condenser, or absorber); or an equivalent system. The storage tanks (EUG-1) are all subject to this subpart. The permittee shall

comply with this subpart by using external floating roofs as defined in §60.112b(a)(2). The permit will also require compliance with the testing (§60.113b), reporting and recordkeeping (§60.115b), and monitoring (§60.116b) of this subpart. In addition, the facility shall comply with all the applicable requirements 40 CFR Part 60 Subpart A including the notifications as described in §60.7.
Subpart GG, Stationary Gas Turbines. This subpart affects combustion turbines which commenced construction, reconstruction, or modification after October 3, 1977, and which have a heat input rating of 10 MMBTUH or more. There are no turbines at this facility.
Subpart KKK, Equipment Leaks of VOC from Onshore Natural Gas Processing Plants. This subpart applies to natural gas processing plants constructed, reconstructed or modified after January 20, 1984 but prior to August 23, 2011. The facility does not engage in natural gas processing.
Subpart LLL, Onshore Natural Gas Processing: SO_2 Emissions. This subpart affects sweetening units and sweetening units followed by sulfur recovery units. This facility does not have a sweetening unit.
Subpart IIII, Stationary Compression Ignition (CI) Internal Combustion Engines (ICE). This subpart , affects CI ICE based on power and displacement ratings, depending on date of construction, beginning with those constructed after July 11, 2005. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. The emergency generator is a diesel-fired CI ICE. The engine will comply with the monitoring, recordkeeping, and reporting requirements of this subpart.
Subpart JJJJ, Stationary Spark Ignition Internal Combustion Engines (SI-ICE). This subpart promulgates emission standards for all new SI engines ordered after June 12, 2006, and all SI engines modified or reconstructed after June 12, 2006, regardless of size. There are no SI engines at this facility.
Subpart OOOO, Crude Oil and Natural Gas Production, Transmission, and Distribution. This subpart affects natural gas wells, centrifugal compressors, reciprocating compressors, pneumatic controllers, storage vessels, onshore natural gas processing plants, and onshore natural gas sweetening units that commence construction, modification, or reconstruction after August 23, 2011, and on or before September 18, 2015. All equipment at the facility will commence construction after September 18, 2015. Therefore, this subpart does not apply.
Subpart OOOOa, Crude Oil and Natural Gas Facilities. This subpart applies to hydraulically fractured wells, centrifugal compressors, reciprocating compressors, pneumatic controllers and pumps, natural gas processing plants, storage vessels, equipment leaks, and natural gas sweetening units that commence construction, modification, or reconstruction after September 18, 2015. All equipment at the facility will commence construction after this date and the storage vessels and equipment leaks at this facility are potentially subject. However, this subpart only affects facilities located in the crude oil production source category, which includes the well and extends to the point of custody transfer to the crude oil transmission pipeline or any other forms of transportation. All liquids received by this facility will have already passed the point of custody transfer to a crude oil transmission pipeline. Also, the storage vessels located at this facility are subject to NSPS Subpart Kb and are therefore exempt from NSPS Subpart OOOOa per §60.5395a(e).Therefore, this subpart does not apply.

NESHAP, 40 CFR Part 61 [Not Applicable]
There are no emissions of any of the regulated pollutants: arsenic, asbestos, benzene, beryllium, coke oven emissions, mercury, radionuclides, or vinyl chloride except for trace amounts of benzene. Subpart J, Equipment Leaks of Benzene, concerns only process streams that contain more than 10% benzene by weight. All process streams at this facility are below this threshold.

NESHAP, 40 CFR Part 63 [Subpart ZZZZ is Applicable]
Subpart R, Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations). This subpart only applies to gasoline facilities which are major sources of HAPs. The facility is not a major source of HAPs. This facility does not store gasoline. Therefore, this facility is not subject to this subpart.
Subpart EEEE, Organic Liquids Distribution (Non-Gasoline). This subpart affects organic liquid distribution (OLD) operations only at major sources of HAP emissions with an organic liquid throughput greater than 7.29 million gallons per year (173,571 bbl/yr). This facility is not a major source of HAPs. Therefore, this facility is not subject to this subpart.
Subpart BBBBBB, Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities. This subpart affects area sources that are bulk gasoline terminals that are not subject to the control requirements of 40 CFR Part 63, Subpart R or 40 CFR Part 63, Subpart CC, pipeline breakout stations that are not subject to the control requirements of 40 CFR Part 63 Subpart R, pipeline pumping stations, and bulk gasoline plants. The facility does not handle gasoline and is therefore not subject to this subpart.
Subpart ZZZZ, Reciprocating Internal Combustion Engines (RICE). This subpart affects any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions. Owners and operators of the following new or reconstructed RICE must meet the requirements of Subpart ZZZZ by complying with either 40 CFR Part 60 Subpart IIII (for CI engines) or 40 CFR Part 60 Subpart JJJJ (for SI engines):

1) Stationary RICE located at an area source;
2) The following Stationary RICE located at a major source of HAP emissions:
    i) 2SLB and 4SRB stationary RICE with a site rating of ≤ 500 brake HP;
    ii) 4SLB stationary RICE with a site rating of < 250 brake HP;
    iii) Stationary RICE with a site rating of ≤ 500 brake HP which combust landfill or digester gas equivalent to 10% or more of the gross heat input on an annual basis;
    iv) Emergency or limited use stationary RICE with a site rating of ≤ 500 brake HP; and
    v) CI stationary RICE with a site rating of ≤ 500 brake HP.

No further requirements apply for engines subject to NSPS under this part. Based on emission calculations, the terminal is an area source of HAP emissions and the stationary engines are subject to this subpart. The stationary engine will comply with this subpart.

CAM, 40 CFR Part 64 [Not Applicable]
Compliance Assurance Monitoring (CAM) as published in the Federal Register on October 22, 1997, applies to any pollutant specific emission unit at a major source that is required to obtain a Title V permit, if it meets all of the following criteria:

- It is subject to an emission limit or standard for an applicable regulated air pollutant.
- It uses a control device to achieve compliance with the applicable emission limit or standard.
- It has potential emissions, prior to the control device, of the applicable regulated air pollutant greater than major source threshold.

There are no individual emission units at this facility that meet all of the above criteria. Although the facility is a major source required to obtain a part 70 permit, the storage tanks will not be equipped with control devices and is not subject to CAM monitoring. Control devices do not include passive control measures such as seals, lids or roofs.

Chemical Accident Prevention Provisions, 40 CFR Part 68 [Not Applicable]
The definition of a stationary source does not apply to transportation, including storage incident to transportation, of any regulated substance or any other extremely hazardous substance under the provisions of this part. Naturally occurring hydrocarbon mixtures, prior to entry into a natural gas processing plant or a petroleum refining process unit, including: condensate, crude oil, field gas, and produced water, are exempt for the purpose of determining whether more than a threshold quantity of a regulated substance is present at the stationary source. More information on this federal program is available on the web page: *www.epa.gov/rmp*.

Stratospheric Ozone Protection, 40 CFR Part 82 [Subpart A and F are Applicable]
These standards require phase out of Class I & II substances, reductions of emissions of Class I & II substances to the lowest achievable level in all use sectors, and banning use of nonessential products containing ozone-depleting substances (Subparts A & C); control servicing of motor vehicle air conditioners (Subpart B); require Federal agencies to adopt procurement regulations which meet phase out requirements and which maximize the substitution of safe alternatives to Class I and Class II substances (Subpart D); require warning labels on products made with or containing Class I or II substances (Subpart E); maximize the use of recycling and recovery upon disposal (Subpart F); require producers to identify substitutes for ozone-depleting compounds under the Significant New Alternatives Program (Subpart G); and reduce the emissions of halons (Subpart H).
Subpart A identifies ozone-depleting substances and divides them into two classes. Class I controlled substances are divided into seven groups; the chemicals typically used by the manufacturing industry include carbon tetrachloride (Class I, Group IV) and methyl chloroform (Class I, Group V). A complete phase-out of production of Class I substances is required by January 1, 2000 (January 1, 2002, for methyl chloroform). Class II chemicals, which are hydrochlorofluorocarbons (HCFCs), are generally seen as interim substitutes for Class I CFCs. Class II substances consist of 33 HCFCs. A complete phase-out of Class II substances, scheduled in phases starting by 2002, is required by January 1, 2030.
Subpart F requires that any persons servicing, maintaining, or repairing appliances except for motor vehicle air conditioners; persons disposing of appliances, including motor vehicle air conditioners; refrigerant reclaimers, appliance owners, and manufacturers of appliances and recycling and recovery equipment comply with the standards for recycling and emissions reduction.

The standard conditions of the permit address the requirements specified at §82.156 for persons opening appliances for maintenance, service, repair, or disposal; §82.158 for equipment used during the maintenance, service, repair, or disposal of appliances; §82.161 for certification by an approved technician certification program of persons performing maintenance, service, repair, or disposal of appliances; §82.166 for recordkeeping; § 82.158 for leak repair requirements; and §82.166 for refrigerant purchase records for appliances normally containing 50 or more pounds of refrigerant.

This facility does not utilize any Class I or Class II substances.

SECTION VIII. COMPLIANCE

A. Tier Classification and Public Review

This application has been determined to be a Tier III based on the fact that it is a request for a construction permit for a new PSD major source.

The applicant published the DEQ "Notice of Tier III Permit Application Filing" on February 8, 2017 and a "Notice of Tier III Draft Permit" on October 21, 2017 in The Cushing Citizen, a twice-weekly newspaper published in Cushing, Payne County, Oklahoma. The notices stated that the application and draft permit were available for review in the Cushing City Library at 215 N Steele Avenue, Cushing, Oklahoma 74023, or at the DEQ main office at 707 N. Robinson, Oklahoma City, Oklahoma. No comments were received from the public.

The applicant is required to give public notice that a Tier III proposed permit has been prepared by DEQ. A 20-day public review period must be provided, during which an administrative hearing on the proposed permit can be requested. The proposed permit was submitted for a minimum 20-day review. The applicant published the DEQ "Notice of Tier III Proposed Permit" in *The Cushing Citizen* on December 9, 2017. The notice stated the proposed permit was available for public review in the Cushing City Library at 215 N Steele Avenue, Cushing, Oklahoma 74023, or at the DEQ main office at 707 N. Robinson, Oklahoma City, Oklahoma. No requests for an administrative hearing were made.

The permittee has submitted an affidavit that they are not seeking a permit for land use or for any operation upon land owned by others without their knowledge. The affidavit certifies that the applicant (or applicant business) has notified the landowner(s) by means of an actual notice, for which the applicant has a signed and dated receipt. Information on all permits is available for review by the public in the Air Quality Section of the DEQ Web Page: http://www.deq.state.ok.us.

B. State Review

This facility is not located within 50 miles of the Oklahoma border. Therefore, no bordering states will be notified of the draft permit.

C. EPA Review

Tallgrass requested and was granted concurrent public and EPA review periods. The draft permit was sent to EPA for a minimum review period of 45-days. Since no comments were received from the public, the draft permit was deemed the proposed permit. No comments were received from the EPA.

SECTION IX. FEES PAID

A fee of $7,500 is required for a new Part 70 source. A payment of $7,500 was received on February 1, 2017.

SECTION X. SUMMARY

The facility has demonstrated the ability to comply with the requirements of the several air pollution control rules and regulations. Ambient air quality standards are not threatened at this site. There are no active Air Quality compliance or enforcement issues concerning this facility. Issuance of this construction permit is recommended.

O K L A H O M A
DEPARTMENT OF ENVIRONMENTAL QUALITY

SCOTT A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

MARY FALLIN
Governor

JAN 10 2018

Tallgrass Terminal, LLC
Attn: Beau Wagner
370 Van Gordon Street
Lakewood, CO 80228

SUBJECT: Major Source Construction Permit No. **2017-0121-C (PSD)**
Tallgrass Terminal, LLC
Cushing South Tank Farm
Facility ID No. 17009
N/2 Section 27, Township 17N, Range 5E
Cushing, Lincoln County, Oklahoma

Dear Mr. Wagner:

Enclosed is the permit authorizing operation of the facility referenced above. Please note that this permit is issued subject to standard and specific conditions, which are attached. These conditions must be carefully followed since they define the limits of the permit and will be confirmed by periodic inspections.

Also note that you are required to annually submit an emissions inventory for this facility. An emissions inventory must be completed on approved AQD forms and submitted (hardcopy or electronically) by April 1st of every year. Any questions concerning the form or submittal process should be referred to the Emissions Inventory Staff at (405) 702-4100.

Thank you for your cooperation in this matter. If we may be of further service, or you have any questions about this permit, please refer to the permit number above and contact our office at (405) 702-4100.

Sincerely,

Phillip Fielder, P.E.
Permits and Engineering Group Manager
AIR QUALITY DIVISION

PART 70 PERMIT

AIR QUALITY DIVISION
STATE OF OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY
707 N. ROBINSON, SUITE 4100
P.O. BOX 1677
OKLAHOMA CITY, OKLAHOMA 73101-1677

Permit No. 2017-0121-C (PSD)

Tallgrass Terminal, LLC,

having complied with the requirements of the law, is hereby granted permission to construct the Cushing South Tank Farm at Section 27, Township 17N, Range 5E, Lincoln County, Oklahoma, subject to the Standard Conditions dated June 21, 2016, and the Specific Conditions both of which are attached.

In the absence of commencement of construction, this permit shall expire 18 months from the issuance date, except as authorized under Section VIII of the Standard Conditions.

Director, DEQ

1-4-18
Date

PERMIT TO CONSTRUCT
AIR POLLUTION CONTROL FACILITY
SPECIFIC CONDITIONS

Tallgrass Terminals Inc. **Permit No. 2017-0121-C (PSD)**
Cushing South Tank Farm

The permittee is authorized to construct in conformity with the specifications submitted to Air Quality on February 1, 2017. The evaluation Memorandum, data January 3, 2018, explains the derivation of applicable permit requirements and estimates of emissions; however, it does not contain operating limitations or permit requirements. Commencing construction or continuing operations under this permit constitutes acceptance of, and consent to, the conditions contained herein:

1. Points of emissions limitations for each point: [OAC 252:100-8-6(a)(1)]

A. EUG 1 and EUG 2: NSPS Subpart Kb Tanks

EU ID#	Contents	Roof Type[1]	Capacity (bbl)	W/S VOC (TPY)	Landing VOC (ton/event)	Cleaning VOC (ton/event)	Construct Date
T-101	Crude Oil	EFR	500,000	5.33	6.4	46.1	TBD
T-102	Crude Oil	EFR	500,000	5.33			TBD
T-103	Crude Oil	EFR	500,000	5.33			TBD
T-104	Crude Oil	EFR	500,000	5.33			TBD
T-105	Crude Oil	EFR	500,000	5.33			TBD
T-106	Crude Oil	EFR	500,000	5.33			TBD
T-107	Crude Oil	EFR	250,000	3.87	3.3	23.6	TBD
T-108	Crude Oil	EFR	250,000	3.87			TBD
T-109	Crude Oil	EFR	250,000	3.87			TBD
T-110	Crude Oil	EFR	250,000	3.87			TBD
T-111	Crude Oil	EFR	250,000	3.87			TBD
T-112	Crude Oil	EFR	250,000	3.87			TBD
T-113	Crude Oil	EFR	250,000	3.87			TBD
T-114	Crude Oil	EFR	250,000	3.87			TBD
T-115	Crude Oil	EFR	250,000	3.87			TBD
T-116	Crude Oil	EFR	250,000	3.87			TBD
T-117	Crude Oil	IFR	1,000	4.89	< 0.02	1.41	TBD
T-118	Crude Oil	IFR	1,000	4.89			TBD
T-119	Crude Oil	IFR	1,000	4.89			TBD
T-120	Crude Oil	IFR	1,000	4.89			TBD

[1] – EFR = External Floating Roof. IFR – Internal Floating Roof

a. Tanks T-101 - T-116 shall be equipped with an external floating roof.
b. Tanks T-117 - T-120 shall be equipped with an internal floating roof.

c. Each external floating roof shall be equipped with a primary mechanical shoe seal and a secondary seal.

B. EUG 3: Roof Landings

In any continuous 12-month period, facility-wide VOC emissions from tank roof landings shall not exceed 35.7 TPY, and tank landing VOC emissions shall be limited as follows:

a. The sum of emissions from all 500K-bbl tank landings shall not exceed 19.2 TPY.
b. The sum of emissions from all 250K-bbl tank landings shall not exceed 16.4 TPY.
c. The sum of emissions from 1,000-bbl tank landings shall not exceed < 0.04 TPY.

C. EUG 4: Tank Cleanings

In any continuous 12-month period, facility-wide VOC emissions from tank cleanings shall not exceed 94.7 TPY, and tank cleaning VOC emissions shall be limited as follows:

a. The sum of emissions from all 500K-bbl tank cleanings shall not exceed 46.1 TPY.
b. The sum of emissions from all 250K-bbl tank cleanings shall not exceed 47.1 TPY.
c. The sum of emissions from 1,000-bbl tank cleanings shall not exceed 1.41 TPY.

D. EUG 5: Emergency Use Engines

All engines at the facility shall be certified to meet the EPA Tier 3 emissions standard of 3.0 g/hp-hr NMHC + NO_X. The facility is authorized to operate the emergency-use engines as listed below.

Unit ID	Rating (hp)	Fuel
GEN-1	450	Diesel

E. EUG 6: Fugitive Equipment Leaks

Fugitive equipment items are not limited in number or VOC emissions. The associated emissions shall be included to demonstrate compliance with the facility-wide emission limits. The facility will maintain an updated list of all fugitive emission sources. The facility will prepare, implement, and maintain a Spill Prevention, Control, and Countermeasure (SPCC) Plan as required by 40 CFR Part 112. This plan requires regular inspection of all aboveground valves, piping, and appurtenances. Records of quarterly inspections and any identified visual leaks shall be maintained. Visual leaks shall be repaired as soon as practical, and records of corrective actions shall be maintained. The SPCC inspection requirement also applies to pigging equipment and sump tanks, which are otherwise classified as Trivial Activities.

F. Facility-Wide Emission Limit

Facility-wide emissions of Hazardous Air Pollutants (HAP) from all sources (tanks, fugitives, and any other HAP emission source) are limited to not more than 9.9 tons of any single HAP or 24.9 tons of any combination of HAPs in any continuous 12-month period. Emission calculations shall be modeled based on the actual contents of the tanks.

G. Compliance shall be demonstrated by:

a. A rolling 12-month total of VOC and HAP emissions calculated monthly no later than 30 days after the end of each month.
b. TANKS4.0 or other emission estimation software approved by AQD.
c. Records of material stored and throughput for each tank.
d. Calculations of emissions from roof landing events.
e. Calculations of emissions from tank cleaning events.
f. Inclusion of emission estimates for fugitive HAP sources and any other identified sources of HAP emissions.

2. Each tank in EUG 1 and EUG 2 is subject to federal New Source Performance Standards, 40 CFR Part 60, Subpart Kb, and shall comply with all applicable requirements for external floating roof tanks which shall include, but are not limited to, the following requirements: [40 CFR Part 60.110b through 60.116b]

a. § 60.110b Applicability and designation of affected facility.
b. § 60.111b Definitions.
c. § 60.112b Standard for volatile organic compounds (VOC).
d. § 60.113b Testing procedures.
e. § 60.114b Alternative means of emission limitation.
f. § 60.115b Reporting and recordkeeping requirements.
g. § 60.116b Monitoring of operations.

3. For each stationary engine in EUG 5, the permittee shall comply with all applicable requirements of 40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines and shall comply with all applicable requirements including but not limited to the following:

a. § 60.4200 Am I subject to this subpart?
b. § 60.4201 What emission standards must I meet for non-emergency engines if I am a stationary CI internal combustion engine manufacturer?
c. § 60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?
d. § 60.4203 How long must my engines meet the emission standards if I am a stationary CI internal combustion engine manufacturer?
e. § 60.4204 What emission standards must I meet for non-emergency engines if I am an owner or operator of a stationary CI internal combustion engine?
f. § 60.4206 How long must I meet the emission standards if I am an owner or operator of a stationary CI internal combustion engine?
g. § 60.4207 What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?
h. § 60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?
i. § 60.4210 What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?

j. § 60.4211 What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?
k. § 60.4212 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?
l. §60.4214 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?
m. § 60.4217 What emission standards must I meet if I am an owner or operator of a stationary internal combustion engine using special fuels?
n. § 60.4218 What parts of the General Provisions apply to me?
o. § 60.4219 What definitions apply to this subpart?

4. The owner/operator shall comply with all applicable requirements of the NESHAP: Reciprocating Internal Combustion Engines, Subpart ZZZZ, for each affected facility including but not limited to: [40 CFR 63.6580 through 63.6675]

   a. § 63.6580 What is the purpose of subpart ZZZZ?
   b. § 63.6585 Am I subject to this subpart?
   c. § 63.6590 What parts of my plant does this subpart cover?
   d. § 63.6595 When do I have to comply with this subpart?
   e. § 63.6603 What emission limitations, operating limitations, and other requirements must I meet if I own or operate an existing stationary RICE located at an area source of HAP emissions?
   f. § 63.6605 What are my general requirements for complying with this subpart?
   g. § 63.6625 What are my monitoring, installation, collection, operation, and maintenance requirements?
   h. § 63.6630 How do I demonstrate initial compliance with the emission limitations, operating limitations, and other requirements?
   i. § 63.6640 How do I demonstrate continuous compliance with the emission limitations, operating limitations, and other requirements?
   j. § 63.6650 What reports must I submit and when?
   k. § 63.6655 What records must I keep?
   l. § 63.6660 In what form and how long must I keep my records?
   m. § 63.6665 What parts of the General Provisions apply to me?
   n. § 63.6670 Who implements and enforces this subpart?
   o. § 63.6675 What definitions apply to this subpart?

5. Upon issuance of an operating permit, the permittee shall be authorized to operate this facility continuously (24 hours per day, every day of the year). [OAC 252:100-8-6(a)]

6. Alternative materials other than crude oil may be stored in the tanks provided the true vapor pressure of alternative material is less than 11.1 psia at storage conditions and there will be no exceedance of the permitted 12-month VOC emission limits. HAP emission from such alternate storage, combined with HAP emissions from storage of crude oil, may not exceed major source thresholds for any 12-month period. The permittee must provide 30 days advance written notice to DEQ and EPA of such a change. The notice shall provide a brief

description of the change, effective date, any change in emissions (including HAPs) between the storage of alternative material and the storage of crude oil in the tank, and list (if any) permit terms or conditions no longer applicable as a result.

[OAC 252:100-8-6(f)]

7. Each tank to which these specific conditions apply shall have a permanent means of identification which distinguishes it from other equipment. [OAC 252:100-8-5(e)(3)(B)]

8. The facility shall not handle crude oil with a hydrogen sulfide (H_2S) concentration exceeding 135 ppmw. Compliance shall be demonstrated by one of the following:

[OAC 252:100-8-6(a)(1) & (3)]

   a. Keep records of documentation from a Crude Oil Assay Library or assays from the crude oil producer, seller, or buyer, which demonstrate the range of H_2S concentration in the crude oil.
   b. Sampling by the permittee for H_2S concentration. Test methods may include UOP 163-89, ASTM D 5705, liquid phase H_2S analyzers, or lab certified liquid phase methods.

9. The permittee shall maintain records of operations as listed below. These records shall be retained on-site for at least five years from the date of recording, inspection, testing, or repair, and shall be made available to regulatory personnel upon request.

[OAC 252:100-8-6(a)(3)(B)]

   a. Throughput for each tank in Specific Condition No. 1 (monthly and 12-month rolling totals calculated no later than 30 days after the end of each month). Throughput shall be derived from flow measurement or tank level height changes.
   b. Records of emissions calculations to show compliance with VOC and HAP emission limits in Specific Condition No. 1 (monthly and 12-month rolling total).
   c. Records of emissions calculations for roof landings and cleanings for each tank type.
   d. Type of liquid material, maximum true vapor pressure, and period of storage for each tank.
   e. Records as required by Specific Condition No. 8.
   f. Records required by NSPS 40 CFR Part 60, Subparts Kb and IIII.
   g. Records required by NESHAP 40 CFR Part 63, Subpart ZZZZ.

10. The Permit Shield (Standard Conditions, Section VI) is extended to the following requirements that have been determined to be inapplicable to this facility.

[OAC 252:100-8-6(d)(2)]

   a. OAC 252:100-7 Permits for Minor Facilities
   b. OAC 252:100-11 Alternative Emissions Reduction
   c. OAC 252:100-15 Mobile Sources
   d. OAC 252:100-39 Nonattainment Areas

11. The permittee shall submit an administratively complete operating permit application for an initial Title V operating permit within 180 days of start-up of any new unit authorized by this construction permit. [OAC 252:100-8-4(b)(5)(A)]

MAJOR SOURCE AIR QUALITY PERMIT
STANDARD CONDITIONS
(June 21, 2016)

SECTION I. DUTY TO COMPLY

A. This is a permit to operate / construct this specific facility in accordance with the federal Clean Air Act (42 U.S.C. 7401, et al.) and under the authority of the Oklahoma Clean Air Act and the rules promulgated there under. [Oklahoma Clean Air Act, 27A O.S. § 2-5-112]

B. The issuing Authority for the permit is the Air Quality Division (AQD) of the Oklahoma Department of Environmental Quality (DEQ). The permit does not relieve the holder of the obligation to comply with other applicable federal, state, or local statutes, regulations, rules, or ordinances. [Oklahoma Clean Air Act, 27A O.S. § 2-5-112]

C. The permittee shall comply with all conditions of this permit. Any permit noncompliance shall constitute a violation of the Oklahoma Clean Air Act and shall be grounds for enforcement action, permit termination, revocation and reissuance, or modification, or for denial of a permit renewal application. All terms and conditions are enforceable by the DEQ, by the Environmental Protection Agency (EPA), and by citizens under section 304 of the Federal Clean Air Act (excluding state-only requirements). This permit is valid for operations only at the specific location listed.

[40 C.F.R. §70.6(b), OAC 252:100-8-1.3 and OAC 252:100-8-6(a)(7)(A) and (b)(1)]

D. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit. However, nothing in this paragraph shall be construed as precluding consideration of a need to halt or reduce activity as a mitigating factor in assessing penalties for noncompliance if the health, safety, or environmental impacts of halting or reducing operations would be more serious than the impacts of continuing operations. [OAC 252:100-8-6(a)(7)(B)]

SECTION II. REPORTING OF DEVIATIONS FROM PERMIT TERMS

A. Any exceedance resulting from an emergency and/or posing an imminent and substantial danger to public health, safety, or the environment shall be reported in accordance with Section XIV (Emergencies). [OAC 252:100-8-6(a)(3)(C)(iii)(I) & (II)]

B. Deviations that result in emissions exceeding those allowed in this permit shall be reported consistent with the requirements of OAC 252:100-9, Excess Emission Reporting Requirements.

[OAC 252:100-8-6(a)(3)(C)(iv)]

C. Every written report submitted under this section shall be certified as required by Section III (Monitoring, Testing, Recordkeeping & Reporting), Paragraph F.

[OAC 252:100-8-6(a)(3)(C)(iv)]

SECTION III. MONITORING, TESTING, RECORDKEEPING & REPORTING

A. The permittee shall keep records as specified in this permit. These records, including monitoring data and necessary support information, shall be retained on-site or at a nearby field office for a period of at least five years from the date of the monitoring sample, measurement, report, or application, and shall be made available for inspection by regulatory personnel upon request. Support information includes all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit. Where appropriate, the permit may specify that records may be maintained in computerized form.

[OAC 252:100-8-6 (a)(3)(B)(ii), OAC 252:100-8-6(c)(1), and OAC 252:100-8-6(c)(2)(B)]

B. Records of required monitoring shall include:

(1) the date, place and time of sampling or measurement;
(2) the date or dates analyses were performed;
(3) the company or entity which performed the analyses;
(4) the analytical techniques or methods used;
(5) the results of such analyses; and
(6) the operating conditions existing at the time of sampling or measurement.

[OAC 252:100-8-6(a)(3)(B)(i)]

C. No later than 30 days after each six (6) month period, after the date of the issuance of the original Part 70 operating permit or alternative date as specifically identified in a subsequent Part 70 operating permit, the permittee shall submit to AQD a report of the results of any required monitoring. All instances of deviations from permit requirements since the previous report shall be clearly identified in the report. Submission of these periodic reports will satisfy any reporting requirement of Paragraph E below that is duplicative of the periodic reports, if so noted on the submitted report. [OAC 252:100-8-6(a)(3)(C)(i) and (ii)]

D. If any testing shows emissions in excess of limitations specified in this permit, the owner or operator shall comply with the provisions of Section II (Reporting Of Deviations From Permit Terms) of these standard conditions. [OAC 252:100-8-6(a)(3)(C)(iii)]

E. In addition to any monitoring, recordkeeping or reporting requirement specified in this permit, monitoring and reporting may be required under the provisions of OAC 252:100-43, Testing, Monitoring, and Recordkeeping, or as required by any provision of the Federal Clean Air Act or Oklahoma Clean Air Act. [OAC 252:100-43]

F. Any Annual Certification of Compliance, Semi Annual Monitoring and Deviation Report, Excess Emission Report, and Annual Emission Inventory submitted in accordance with this permit shall be certified by a responsible official. This certification shall be signed by a responsible official, and shall contain the following language: "I certify, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete."

[OAC 252:100-8-5(f), OAC 252:100-8-6(a)(3)(C)(iv), OAC 252:100-8-6(c)(1), OAC 252:100-9-7(e), and OAC 252:100-5-2.1(f)]

G. Any owner or operator subject to the provisions of New Source Performance Standards ("NSPS") under 40 CFR Part 60 or National Emission Standards for Hazardous Air Pollutants ("NESHAPs") under 40 CFR Parts 61 and 63 shall maintain a file of all measurements and other information required by the applicable general provisions and subpart(s). These records shall be maintained in a permanent file suitable for inspection, shall be retained for a period of at least five years as required by Paragraph A of this Section, and shall include records of the occurrence and duration of any start-up, shutdown, or malfunction in the operation of an affected facility, any malfunction of the air pollution control equipment; and any periods during which a continuous monitoring system or monitoring device is inoperative.

[40 C.F.R. §§60.7 and 63.10, 40 CFR Parts 61, Subpart A, and OAC 252:100, Appendix Q]

H. The permittee of a facility that is operating subject to a schedule of compliance shall submit to the DEQ a progress report at least semi-annually. The progress reports shall contain dates for achieving the activities, milestones or compliance required in the schedule of compliance and the dates when such activities, milestones or compliance was achieved. The progress reports shall also contain an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted. [OAC 252:100-8-6(c)(4)]

I. All testing must be conducted under the direction of qualified personnel by methods approved by the Division Director. All tests shall be made and the results calculated in accordance with standard test procedures. The use of alternative test procedures must be approved by EPA. When a portable analyzer is used to measure emissions it shall be setup, calibrated, and operated in accordance with the manufacturer's instructions and in accordance with a protocol meeting the requirements of the "AQD Portable Analyzer Guidance" document or an equivalent method approved by Air Quality.

[OAC 252:100-8-6(a)(3)(A)(iv), and OAC 252:100-43]

J. The reporting of total particulate matter emissions as required in Part 7 of OAC 252:100-8 (Permits for Part 70 Sources), OAC 252:100-19 (Control of Emission of Particulate Matter), and OAC 252:100-5 (Emission Inventory), shall be conducted in accordance with applicable testing or calculation procedures, modified to include back-half condensables, for the concentration of particulate matter less than 10 microns in diameter (PM_{10}). NSPS may allow reporting of only particulate matter emissions caught in the filter (obtained using Reference Method 5).

K. The permittee shall submit to the AQD a copy of all reports submitted to the EPA as required by 40 C.F.R. Part 60, 61, and 63, for all equipment constructed or operated under this permit subject to such standards. [OAC 252:100-8-6(c)(1) and OAC 252:100, Appendix Q]

SECTION IV. COMPLIANCE CERTIFICATIONS

A. No later than 30 days after each anniversary date of the issuance of the original Part 70 operating permit or alternative date as specifically identified in a subsequent Part 70 operating permit, the permittee shall submit to the AQD, with a copy to the US EPA, Region 6, a certification of compliance with the terms and conditions of this permit and of any other applicable requirements which have become effective since the issuance of this permit.

[OAC 252:100-8-6(c)(5)(A), and (D)]

B. The compliance certification shall describe the operating permit term or condition that is the basis of the certification; the current compliance status; whether compliance was continuous or intermittent; the methods used for determining compliance, currently and over the reporting period. The compliance certification shall also include such other facts as the permitting authority may require to determine the compliance status of the source.
[OAC 252:100-8-6(c)(5)(C)(i)-(v)]

C. The compliance certification shall contain a certification by a responsible official as to the results of the required monitoring. This certification shall be signed by a responsible official, and shall contain the following language: "I certify, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete." [OAC 252:100-8-5(f) and OAC 252:100-8-6(c)(1)]

D. Any facility reporting noncompliance shall submit a schedule of compliance for emissions units or stationary sources that are not in compliance with all applicable requirements. This schedule shall include a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance with any applicable requirements for which the emissions unit or stationary source is in noncompliance. This compliance schedule shall resemble and be at least as stringent as that contained in any judicial consent decree or administrative order to which the emissions unit or stationary source is subject. Any such schedule of compliance shall be supplemental to, and shall not sanction noncompliance with, the applicable requirements on which it is based, except that a compliance plan shall not be required for any noncompliance condition which is corrected within 24 hours of discovery.
[OAC 252:100-8-5(e)(8)(B) and OAC 252:100-8-6(c)(3)]

SECTION V. REQUIREMENTS THAT BECOME APPLICABLE DURING THE PERMIT TERM

The permittee shall comply with any additional requirements that become effective during the permit term and that are applicable to the facility. Compliance with all new requirements shall be certified in the next annual certification. [OAC 252:100-8-6(c)(6)]

SECTION VI. PERMIT SHIELD

A. Compliance with the terms and conditions of this permit (including terms and conditions established for alternate operating scenarios, emissions trading, and emissions averaging, but excluding terms and conditions for which the permit shield is expressly prohibited under OAC 252:100-8) shall be deemed compliance with the applicable requirements identified and included in this permit. [OAC 252:100-8-6(d)(1)]

B. Those requirements that are applicable are listed in the Standard Conditions and the Specific Conditions of this permit. Those requirements that the applicant requested be determined as not applicable are summarized in the Specific Conditions of this permit. [OAC 252:100-8-6(d)(2)]

SECTION VII. ANNUAL EMISSIONS INVENTORY & FEE PAYMENT

The permittee shall file with the AQD an annual emission inventory and shall pay annual fees based on emissions inventories. The methods used to calculate emissions for inventory purposes shall be based on the best available information accepted by AQD.
[OAC 252:100-5-2.1, OAC 252:100-5-2.2, and OAC 252:100-8-6(a)(8)]

SECTION VIII. TERM OF PERMIT

A. Unless specified otherwise, the term of an operating permit shall be five years from the date of issuance. [OAC 252:100-8-6(a)(2)(A)]

B. A source's right to operate shall terminate upon the expiration of its permit unless a timely and complete renewal application has been submitted at least 180 days before the date of expiration. [OAC 252:100-8-7.1(d)(1)]

C. A duly issued construction permit or authorization to construct or modify will terminate and become null and void (unless extended as provided in OAC 252:100-8-1.4(b)) if the construction is not commenced within 18 months after the date the permit or authorization was issued, or if work is suspended for more than 18 months after it is commenced. [OAC 252:100-8-1.4(a)]

D. The recipient of a construction permit shall apply for a permit to operate (or modified operating permit) within 180 days following the first day of operation. [OAC 252:100-8-4(b)(5)]

SECTION IX. SEVERABILITY

The provisions of this permit are severable and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.
[OAC 252:100-8-6 (a)(6)]

SECTION X. PROPERTY RIGHTS

A. This permit does not convey any property rights of any sort, or any exclusive privilege.
[OAC 252:100-8-6(a)(7)(D)]

B. This permit shall not be considered in any manner affecting the title of the premises upon which the equipment is located and does not release the permittee from any liability for damage to persons or property caused by or resulting from the maintenance or operation of the equipment for which the permit is issued. [OAC 252:100-8-6(c)(6)]

SECTION XI. DUTY TO PROVIDE INFORMATION

A. The permittee shall furnish to the DEQ, upon receipt of a written request and within sixty (60) days of the request unless the DEQ specifies another time period, any information that the DEQ may request to determine whether cause exists for modifying, reopening, revoking,

reissuing, terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the DEQ copies of records required to be kept by the permit.
[OAC 252:100-8-6(a)(7)(E)]

B. The permittee may make a claim of confidentiality for any information or records submitted pursuant to 27A O.S. § 2-5-105(18). Confidential information shall be clearly labeled as such and shall be separable from the main body of the document such as in an attachment.
[OAC 252:100-8-6(a)(7)(E)]

C. Notification to the AQD of the sale or transfer of ownership of this facility is required and shall be made in writing within thirty (30) days after such sale or transfer.
[Oklahoma Clean Air Act, 27A O.S. § 2-5-112(G)]

SECTION XII. REOPENING, MODIFICATION & REVOCATION

A. The permit may be modified, revoked, reopened and reissued, or terminated for cause. Except as provided for minor permit modifications, the filing of a request by the permittee for a permit modification, revocation and reissuance, termination, notification of planned changes, or anticipated noncompliance does not stay any permit condition.
[OAC 252:100-8-6(a)(7)(C) and OAC 252:100-8-7.2(b)]

B. The DEQ will reopen and revise or revoke this permit prior to the expiration date in the following circumstances: [OAC 252:100-8-7.3 and OAC 252:100-8-7.4(a)(2)]

(1) Additional requirements under the Clean Air Act become applicable to a major source category three or more years prior to the expiration date of this permit. No such reopening is required if the effective date of the requirement is later than the expiration date of this permit.
(2) The DEQ or the EPA determines that this permit contains a material mistake or that the permit must be revised or revoked to assure compliance with the applicable requirements.
(3) The DEQ or the EPA determines that inaccurate information was used in establishing the emission standards, limitations, or other conditions of this permit. The DEQ may revoke and not reissue this permit if it determines that the permittee has submitted false or misleading information to the DEQ.
(4) DEQ determines that the permit should be amended under the discretionary reopening provisions of OAC 252:100-8-7.3(b).

C. The permit may be reopened for cause by EPA, pursuant to the provisions of OAC 100-8-7.3(d). [OAC 100-8-7.3(d)]

D. The permittee shall notify AQD before making changes other than those described in Section XVIII (Operational Flexibility), those qualifying for administrative permit amendments, or those defined as an Insignificant Activity (Section XVI) or Trivial Activity (Section XVII). The notification should include any changes which may alter the status of a "grandfathered source," as defined under AQD rules. Such changes may require a permit modification.
[OAC 252:100-8-7.2(b) and OAC 252:100-5-1.1]

E. Activities that will result in air emissions that exceed the trivial/insignificant levels and that are not specifically approved by this permit are prohibited. [OAC 252:100-8-6(c)(6)]

SECTION XIII. INSPECTION & ENTRY

A. Upon presentation of credentials and other documents as may be required by law, the permittee shall allow authorized regulatory officials to perform the following (subject to the permittee's right to seek confidential treatment pursuant to 27A O.S. Supp. 1998, § 2-5-105(17) for confidential information submitted to or obtained by the DEQ under this section):

(1) enter upon the permittee's premises during reasonable/normal working hours where a source is located or emissions-related activity is conducted, or where records must be kept under the conditions of the permit;
(2) have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;
(3) inspect, at reasonable times and using reasonable safety practices, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and
(4) as authorized by the Oklahoma Clean Air Act, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the permit.

[OAC 252:100-8-6(c)(2)]

SECTION XIV. EMERGENCIES

A. Any exceedance resulting from an emergency shall be reported to AQD promptly but no later than 4:30 p.m. on the next working day after the permittee first becomes aware of the exceedance. This notice shall contain a description of the emergency, the probable cause of the exceedance, any steps taken to mitigate emissions, and corrective actions taken.

[OAC 252:100-8-6 (a)(3)(C)(iii)(I) and (IV)]

B. Any exceedance that poses an imminent and substantial danger to public health, safety, or the environment shall be reported to AQD as soon as is practicable; but under no circumstance shall notification be more than 24 hours after the exceedance. [OAC 252:100-8-6(a)(3)(C)(iii)(II)]

C. An "emergency" means any situation arising from sudden and reasonably unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under this permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventive maintenance, careless or improper operation, or operator error. [OAC 252:100-8-2]

D. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs or other relevant evidence that: [OAC 252:100-8-6 (e)(2)]

(1) an emergency occurred and the permittee can identify the cause or causes of the emergency;
(2) the permitted facility was at the time being properly operated;
(3) during the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards or other requirements in this permit.

E. In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency shall have the burden of proof. [OAC 252:100-8-6(e)(3)]

F. Every written report or document submitted under this section shall be certified as required by Section III (Monitoring, Testing, Recordkeeping & Reporting), Paragraph F.
[OAC 252:100-8-6(a)(3)(C)(iv)]

SECTION XV. RISK MANAGEMENT PLAN

The permittee, if subject to the provision of Section 112(r) of the Clean Air Act, shall develop and register with the appropriate agency a risk management plan by June 20, 1999, or the applicable effective date. [OAC 252:100-8-6(a)(4)]

SECTION XVI. INSIGNIFICANT ACTIVITIES

Except as otherwise prohibited or limited by this permit, the permittee is hereby authorized to operate individual emissions units that are either on the list in Appendix I to OAC Title 252, Chapter 100, or whose actual calendar year emissions do not exceed any of the limits below. Any activity to which a State or Federal applicable requirement applies is not insignificant even if it meets the criteria below or is included on the insignificant activities list.

(1) 5 tons per year of any one criteria pollutant.
(2) 2 tons per year for any one hazardous air pollutant (HAP) or 5 tons per year for an aggregate of two or more HAP's, or 20 percent of any threshold less than 10 tons per year for single HAP that the EPA may establish by rule.
[OAC 252:100-8-2 and OAC 252:100, Appendix I]

SECTION XVII. TRIVIAL ACTIVITIES

Except as otherwise prohibited or limited by this permit, the permittee is hereby authorized to operate any individual or combination of air emissions units that are considered inconsequential and are on the list in Appendix J. Any activity to which a State or Federal applicable requirement applies is not trivial even if included on the trivial activities list.
[OAC 252:100-8-2 and OAC 252:100, Appendix J]

SECTION XVIII. OPERATIONAL FLEXIBILITY

A. A facility may implement any operating scenario allowed for in its Part 70 permit without the need for any permit revision or any notification to the DEQ (unless specified otherwise in the permit). When an operating scenario is changed, the permittee shall record in a log at the facility the scenario under which it is operating. [OAC 252:100-8-6(a)(10) and (f)(1)]

B. The permittee may make changes within the facility that:

(1) result in no net emissions increases,
(2) are not modifications under any provision of Title I of the federal Clean Air Act, and
(3) do not cause any hourly or annual permitted emission rate of any existing emissions unit to be exceeded;

provided that the facility provides the EPA and the DEQ with written notification as required below in advance of the proposed changes, which shall be a minimum of seven (7) days, or twenty four (24) hours for emergencies as defined in OAC 252:100-8-6 (e). The permittee, the DEQ, and the EPA shall attach each such notice to their copy of the permit. For each such change, the written notification required above shall include a brief description of the change within the permitted facility, the date on which the change will occur, any change in emissions, and any permit term or condition that is no longer applicable as a result of the change. The permit shield provided by this permit does not apply to any change made pursuant to this paragraph. [OAC 252:100-8-6(f)(2)]

SECTION XIX. OTHER APPLICABLE & STATE-ONLY REQUIREMENTS

A. The following applicable requirements and state-only requirements apply to the facility unless elsewhere covered by a more restrictive requirement:

(1) Open burning of refuse and other combustible material is prohibited except as authorized in the specific examples and under the conditions listed in the Open Burning Subchapter. [OAC 252:100-13]

(2) No particulate emissions from any fuel-burning equipment with a rated heat input of 10 MMBTUH or less shall exceed 0.6 lb/MMBTU. [OAC 252:100-19]

(3) For all emissions units not subject to an opacity limit promulgated under 40 C.F.R., Part 60, NSPS, no discharge of greater than 20% opacity is allowed except for: [OAC 252:100-25]

(a) Short-term occurrences which consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity;
(b) Smoke resulting from fires covered by the exceptions outlined in OAC 252:100-13-7;
(c) An emission, where the presence of uncombined water is the only reason for failure to meet the requirements of OAC 252:100-25-3(a); or
(d) Smoke generated due to a malfunction in a facility, when the source of the fuel producing the smoke is not under the direct and immediate control of the facility and the immediate constriction of the fuel flow at the facility would produce a hazard to life and/or property.

(4) No visible fugitive dust emissions shall be discharged beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or interfere with the maintenance of air quality standards. [OAC 252:100-29]

(5) No sulfur oxide emissions from new gas-fired fuel-burning equipment shall exceed 0.2 lb/MMBTU. No existing source shall exceed the listed ambient air standards for sulfur dioxide. [OAC 252:100-31]

(6) Volatile Organic Compound (VOC) storage tanks built after December 28, 1974, and with a capacity of 400 gallons or more storing a liquid with a vapor pressure of 1.5 psia or greater under actual conditions shall be equipped with a permanent submerged fill pipe or with a vapor-recovery system. [OAC 252:100-37-15(b)]

(7) All fuel-burning equipment shall at all times be properly operated and maintained in a manner that will minimize emissions of VOCs. [OAC 252:100-37-36]

SECTION XX. STRATOSPHERIC OZONE PROTECTION

A. The permittee shall comply with the following standards for production and consumption of ozone-depleting substances: [40 CFR 82, Subpart A]

(1) Persons producing, importing, or placing an order for production or importation of certain class I and class II substances, HCFC-22, or HCFC-141b shall be subject to the requirements of §82.4;
(2) Producers, importers, exporters, purchasers, and persons who transform or destroy certain class I and class II substances, HCFC-22, or HCFC-141b are subject to the recordkeeping requirements at §82.13; and
(3) Class I substances (listed at Appendix A to Subpart A) include certain CFCs, Halons, HBFCs, carbon tetrachloride, trichloroethane (methyl chloroform), and bromomethane (Methyl Bromide). Class II substances (listed at Appendix B to Subpart A) include HCFCs.

B. If the permittee performs a service on motor (fleet) vehicles when this service involves an ozone-depleting substance refrigerant (or regulated substitute substance) in the motor vehicle air conditioner (MVAC), the permittee is subject to all applicable requirements. Note: The term "motor vehicle" as used in Subpart B does not include a vehicle in which final assembly of the vehicle has not been completed. The term "MVAC" as used in Subpart B does not include the air-tight sealed refrigeration system used as refrigerated cargo, or the system used on passenger buses using HCFC-22 refrigerant. [40 CFR 82, Subpart B]
C. The permittee shall comply with the following standards for recycling and emissions reduction except as provided for MVACs in Subpart B: [40 CFR 82, Subpart F]

(1) Persons opening appliances for maintenance, service, repair, or disposal must comply with the required practices pursuant to § 82.156;
(2) Equipment used during the maintenance, service, repair, or disposal of appliances must

comply with the standards for recycling and recovery equipment pursuant to § 82.158;
(3) Persons performing maintenance, service, repair, or disposal of appliances must be certified by an approved technician certification program pursuant to § 82.161;
(4) Persons disposing of small appliances, MVACs, and MVAC-like appliances must comply with record-keeping requirements pursuant to § 82.166;
(5) Persons owning commercial or industrial process refrigeration equipment must comply with leak repair requirements pursuant to § 82.158; and
(6) Owners/operators of appliances normally containing 50 or more pounds of refrigerant must keep records of refrigerant purchased and added to such appliances pursuant to § 82.166.

SECTION XXI. TITLE V APPROVAL LANGUAGE

A. DEQ wishes to reduce the time and work associated with permit review and, wherever it is not inconsistent with Federal requirements, to provide for incorporation of requirements established through construction permitting into the Source's Title V permit without causing redundant review. Requirements from construction permits may be incorporated into the Title V permit through the administrative amendment process set forth in OAC 252:100-8-7.2(a) only if the following procedures are followed:

(1) The construction permit goes out for a 30-day public notice and comment using the procedures set forth in 40 C.F.R. § 70.7(h)(1). This public notice shall include notice to the public that this permit is subject to EPA review, EPA objection, and petition to EPA, as provided by 40 C.F.R. § 70.8; that the requirements of the construction permit will be incorporated into the Title V permit through the administrative amendment process; that the public will not receive another opportunity to provide comments when the requirements are incorporated into the Title V permit; and that EPA review, EPA objection, and petitions to EPA will not be available to the public when requirements from the construction permit are incorporated into the Title V permit.
(2) A copy of the construction permit application is sent to EPA, as provided by 40 CFR § 70.8(a)(1).
(3) A copy of the draft construction permit is sent to any affected State, as provided by 40 C.F.R. § 70.8(b).
(4) A copy of the proposed construction permit is sent to EPA for a 45-day review period as provided by 40 C.F.R.§ 70.8(a) and (c).
(5) The DEQ complies with 40 C.F.R. § 70.8(c) upon the written receipt within the 45-day comment period of any EPA objection to the construction permit. The DEQ shall not issue the permit until EPA's objections are resolved to the satisfaction of EPA.
(6) The DEQ complies with 40 C.F.R. § 70.8(d).
(7) A copy of the final construction permit is sent to EPA as provided by 40 CFR § 70.8(a).
(8) The DEQ shall not issue the proposed construction permit until any affected State and EPA have had an opportunity to review the proposed permit, as provided by these permit conditions.
(9) Any requirements of the construction permit may be reopened for cause after incorporation into the Title V permit by the administrative amendment process, by

DEQ as provided in OAC 252:100-8-7.3(a), (b), and (c), and by EPA as provided in 40 C.F.R. § 70.7(f) and (g).

(10) The DEQ shall not issue the administrative permit amendment if performance tests fail to demonstrate that the source is operating in substantial compliance with all permit requirements.

B. To the extent that these conditions are not followed, the Title V permit must go through the Title V review process.

SECTION XXII. CREDIBLE EVIDENCE

For the purpose of submitting compliance certifications or establishing whether or not a person has violated or is in violation of any provision of the Oklahoma implementation plan, nothing shall preclude the use, including the exclusive use, of any credible evidence or information, relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed.

[OAC 252:100-43-6]